CTP

COMMUNICATIONS TEST
MD-11-DZQCA-G

EP-DZQCA-G-DL-A

FICHE 1 OF 1

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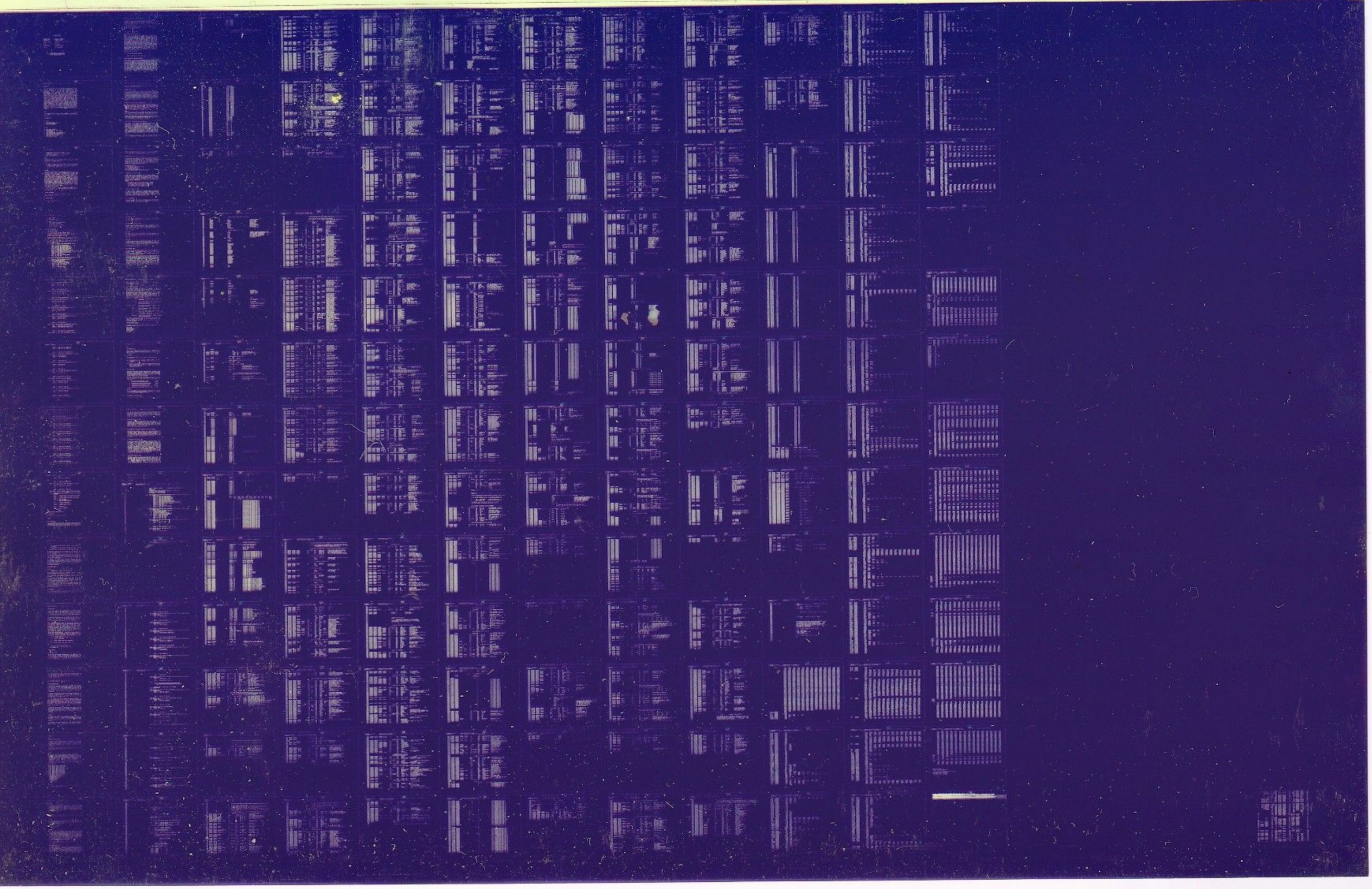
MADE IN USA



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZQCA-F
SUPERSEDES: MAINDEC-11-D9D-

PRODUCT NAME: COMMUNICATION TEST PROGRAM (CTP)

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MAINTAINER: DIAGNOSTIC GROUP

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1.0 ABSTRACT

The function of this test is to detect malfunctions caused by the interaction of multiple communication devices. The test is designed to run 32 DC11 asynchronous line interfaces, 16 KL11 user teletype interfaces, 32 DP11 synchronous line interfaces, 16 DM11 asynchronous multiplexers, 16 DN11 auto calling units (64 lines), one DX11 (IBM 360 or 370 interface), 31 DL11C,D or E asynchronous interfaces, 8 DJ11 asynchronous interfaces one LP11 line printer, one TC11 DECtape, one RF11 disk, one RK11 disk, one RP11 disk, and one KL11 console teletype interface. All devices are fully interrupt driven. This allows a background program to monitor the comm devices (DC's, KL's, DP's, DM's, DL's, DH's, DJ's, DN's) and continuously check NPR data (RF, RK, RP, TC). On the first pass of this program the user must generate the hardware configuration to be tested. This is accomplished by leaving the start address in the console switches when pressing START. A systems configuration of devices currently on the system will be output on the CTY. The program then halts, permitting the user to select the device to be tested. After the intial configuring has been accomplished the restart proceedure is to "LOAD ADDRESS", zero switches, "START".

1.1 NOTE:

This program is run on the original hardware configuration (for communication systems) specified by the customer keysheet.

2.0 REQUIREMENTS

2.1 Equipment

A. PDP-11/20 System (8K core)
B. High speed reader
C. Console typewriter

2.1.1 Options

A. LP11 line printer
B. RF11, RK11 and/or RP11 disks
C. TC11 DECtape
D. DC11 asynchronous line (32.MAX)
E. KL11 asynchronous interface (16.MAX)
F. DP11 synchronous line (32.MAX)
G. DM11 async mux (16.MAX)
H. DN11 auto calling unit (16.MAX)
I. DX11 IBM Front end

J. DM11BB modem control mux (16.MAX)
K. KG11A cycle redundancy check option (8.MAX)
L. DL11C,D,E asynchronous interface (31.MAX)
M. DH11 (to be added)
N. DJ11 asychronous interface (8.MAX)

NOTE:

PERIPHERAL OUTPUT, such as VT05 and VT06 display and LA30 hard copy is "not" meaningfull for other than the line printer or local console TTY.

NOTE:
32 DP11's at 3KHZ (maintenance mode) requires in excess of 100% of the processor time. To run 32 simultaneously the maintenance clocks must be slowed by adding a capacitor to the maint. clk. cap.

2.2 Storage

The core requirements of this program is a function of the hardware under test. It consists of a fixed core requirement (location 000000 thru LINKER and a variable core requirement linker and up. This variable segment is a linker area to point unique-vectored multiple devices to a common interrupt service routine (ISR). Therefore the size of the linker area is a function of the number of devices under test. The linker area requires 3 words per vector followed by 400 bytes per DM11. The 400 byte DM11 buffers must start on a modulo 400 boundry. The DX11 requires 2000(8) bytes of table storage. This storage area must begin on a modulo (2000) boundry. If the DX11 is run online an additional (10)(420) octal bytes are required for tumble table trace tables and control functions. After the DX11 buffers, the rest of unused memory is filled with a special memory exercising routine.

Storage requirements = location 000000 to LINKER plus 3 words per vector plus 400 bytes per DM, plus 2000 or more bytes per DX11. see 7.1 restrictions DX11 online testing.

3.0 LOADING PROCEDURE

This program is assembled in absolute format. The ABS loader is used to load the program.

4.0 USER PROCEDURE

4.1 Initialize Perpherial Devices

A. Line printer:

1) Power "ON"
2) Ready light on
3) "ON LINE" light on

B. DECtape:
1) Mount spare cerified DECtape
2) Place drive in REMOTE
3) Select desired unit number
(when in doubt use unit 0)
(ACT11 select unit 1)

4.2 Operator Interaction

A. Load address 000200

B. Leave start address in WSR, depress START
A systems configuration map will be ouput on the CTY. To suppress further systems configuration map output on restarts set switch register bit #13.

C. Program will HALT and display a "1" one in the data lights indicating switch register selection #1.

D. Set desired switch register option. Switch in up position is a "1" and will cause the corresponding device to be tested.

DATA LIGHTS = 1, GENERAL TEST CONFIGURATION **********

SW00 = 1, TEST NON-COMM DEVICES
SW01 = 1, TEST DC11 ASYNC LINE UNIT
SW02 = 1, TEST KL11 MULTI-USER TTY'S
SW03 = 1, TEST DP11 SYNC LINE UNITS
SW04 = 1, TEST DM11A ASYNC MUX
SW05 = 1, TEST DN11 AUTO CALLING UNITS
SW06 = 1, TEST DM11BB MODEM CONTROL MULTIPLEXERS
SW07 = 1, TEST KG11A CYLIC REDUNDANCY OPTION
SW08 = 1, TEST DX11
SW09 = 1, TEST DL11C,D,E
SW10 = 1, TEST DH11 (TO BE ADDED)
SW11 = 1, TEST DJ11

DATA LIGHTS = 2, NON-COMM TEST CONFIGURATION **********

SW00 = 1, TEST CTY CONSOL TELETYPE
NOTE: DYNAMIC SWITCH SETTING
SW13 MUST BE SELECTED IE = 1
TO TEST CTY (CONSOLE TTY) READER
SW01 = 1, TEST LP11 LINE PRINTER
SW02 = 1, TEST TC11 DECTAPE (SEE "NOTE:" AT 9.8.1)
SW03 = 1, TEST RF11 DISK
SW04 = 1, TEST RK11 DISK
SW05 = 1, TEST RP11 DISK

```
DATA LIGHTS = 3, DC11 TEST CONFIGURATION **********

        SW00 = 1, TEST DC LINE 0
        SW01 = 1, TEST DC LINE 1
          .
          .
          .
        SW15 = 1, TEST DC LINE 15

DATA LIGHTS = 4, DC11 TEST CONFIGURATION (CONTINUED)

        SW00 = 1, TEST DC LINE 16
        SW01 = 1, TEST DC LINE 17
          .
          .
          .
        SW15 = 1, TEST DC LINE 31

DATA LIGHTS = 5, KL11 TEST CONFIGURATION **********

        SW00 = 1, TEST KL LINE 0
        SW01 = 1, TEST KL LINE 1
          .
          .
          .
        SW15 = 1, TEST KL LINE 15

DATA LIGHTS = 6, DP11 TEST CONFIGURATION **********

        SW00 = 1, TEST DP LINE 0
        SW01 = 1, TEST DP LINE 1
          .
          .
          .
        SW15 = 1, TEST DP LINE 15

DATA LIGHTS = 7, DP11 TEST CONFIGURATION (CONTINUED)

        SW00 = 1, TEST DP LINE 16
        SW01 = 1, TEST DP LINE 17
          .
          .
          .
        SW15 = 1, TEST DP LINE 31

DATA LIGHTS = 10, DM11A TEST CONFIGURATION **********

        SW00 = 1, TEST DM11A #0 (LINES  0-15)
        SW01 = 1, TEST DM11A #1 (LINES 16-31)
          .
          .
          .
        SW15 = 1, TEST DM11A #15 (LINES 240-255)

DATA LIGHTS = 11, DN11 TEST CONFIGURATION **********
```

```
        SW00 = 1, TEST DN11 #0 (LINES 0-3)
        SW01 = 1, TEST DN11 #1 (LINES 4-7)
          .
          .
          .
        SW15 = 1, TEST DN11 #15 (LINES 60-63)

DATA LIGHTS = 12, DM11BB TEST CONFIGURATION **********

        SW00 = 1, TEST DM11BB #0
        SW01 = 1, TEST DM11BB #1
          .
          .
          .
        SW15 = 1, TEST DM11B #15

DATA LIGHTS = 13, KG11A TEST CONFIGURATION **********

        SW00 = 1, TEST KG11 #0
        SW01 = 1, TEST KG11 #1
          .
          .
          .
        SW07 = 1, TEST KG11 #7

DATA LIGHTS = 14, DX11 TEST CONFIGURATION **********

        SW00 = 1, TEST DX11 #0
          .
          .
          .
        SW08 = 1, ONLINE TEST OF DX11 #0

DATA LIGHTS = 177400, DX11 #0 CU ADDRESS

DATA LIGHTS = 15, DL11C,D,E TEST CONFIGURATION ********

        SW00 = 1, TEST DL11 LINE #0
        SW01 = 1, TEST DL11 LINE #1
          .
          .
          .
        SW15 = 1, TEST DL11 LINE #15

DATA LIGHTS = 16, DL11C,D,E TEST CONFIGURATION(CONTINUED)

        SW00 = 1, TEST DL11 LINE #16
        SW01 = 1, TEST DL11 LINE #17
          .
          .
          .
        SW14 = 1, TEST DL11 LINE #30

DATA LIGHTS = 200, DJ11 TEST CONFIGURATION
```

```
        SW00 = 1, TEST DJ11 #0
          .
          .
        SW07 = 1, TEST DJ11 #7
DATA LIGHTS = 20, DJ11 #0 TEST CONFIGURATION *********
        SW00 = 1, TEST DJ11 #0 LINE #0
          .
          .
        SW15 = 1, TEST DJ11 #0 LINE #15
DATA LIGHTS = 21, DJ11 #1 TEST CONFIGURATION *********
        SW00 = 1, TEST DJ11 #1 LINE #0
          .
          .
        SW15 = 1, TEST DJ11 #1 LINE #15
DATA LIGHTS = 22, DJ11 #2 TEST CONFIGURATION *********
        SW00 = 1, TEST DJ11 #2 LINE #0
          .
          .
        SW15 = 1, TEST DJ11 #2 LINE #15
DATA LIGHTS = 23, DJ11 #3 TEST CONFIGURATION *********
        SW00 = 1, TEST DJ11 #3 LINE #0
          .
          .
        SW15 = 1, TEST DJ11 #3 LINE #15
DATA LIGHTS = 24, DJ11 #4 TEST CONFIGURATION *********
        SW00 = 1, TEST DJ11 #4 LINE #0
          .
          .
        SW15 = 1, TEST DJ11 #4 LINE #15
DATA LIGHTS = 25, DJ11 #5 TEST CONFIGURATION *********
        SW00 = 1, TEST DJ11 #5 LINE #0
          .
          .
        SW15 = 1, TEST DJ11 #5 LINE #15
DATA LIGHTS = 26, DJ11 #6 TEST CONFIGURATION *********
```

SW00 = 1, TEST DJ11 #6 LINE #0

.

.

SW15 = 1, TEST DJ11 #6 LINE #15

DATA LIGHTS = 27, DJ11 #7 TEST CONFIGURATION *********

SW00 = 1, TEST DJ11 #7 LINE #0

.

.

SW15 = 1, TEST DJ11 #7 LINE #15

DATA LIGHTS = 177777, DYNAMIC SWITCH SETTING **********

NOTE: SW09 SELECTION MAY RESULT IN DEVICE NOT RUNNING REPORTS

SW08 = 1, INHIBIT MEMORY TEST WORST CASE NOISE

SW09 = 1, INHIBIT MEMORY TEST FAST READ/WRITE

SW10 = 1, BELL ON ERROR
0, BELL ON PASS COMPLETED

SW11 = 1, INHIBIT ITERATIONS

SW13 = 1, INHIBIT ERROR TYPEOUT

SW14 = 1, SCOPE LOOP

SW15 = 1, HALT ON ERROR !

5.0 PROGRAM AND/OR OPERATOR ACTION

5.1 Normal HALTS

See Section 4.2 operator interaction

6.0 ERRORS

6.1 Error Reporting

The error reporting format was developed specifically for communication devices. The format assumes that R1 contains the line number (e.g. DC11 #1, DM11 #3 etc.) and that R2 contains the device address. The printout is as follows:

PC	PS	SP
nnnnnn	mmm	111111

Where:

PC "nnnnnn" is the address (within the program) of the error.
PS "nnnnnn" is the contents of the processor status register.
SP "iiiiii" is the contents of the stack pointer.

The numeric typeout is not (with exception of the error PC) necessarily significant for non-communication devices, the DX11 or the DN11.

For the DX11 offline exerciser R1 contains the address of the DX input data buffer and R2 contains the input byte count. Error reporting in the online mode is done at the 360 console using FRIEND.

In addition to hard errors (errors subject to the HALT-ON-ERROR switch) CTP also has a "soft error" reporting routine that indicates that a device has not been serviced within the 8 sec to infinity window of the background monitor. The printout does not inhibit interrupts and is in the following format:

DEVICE NOT RUNNING:
"DEVICE""(n-m)"

Where:

DEVICE will be any of the following:

"ANCILLARIES", "DC11", "KL11", "DP11", "DM11A", "DN11", "DM11B", "KG11", "DX11", "DL11", "DJ11".

And "(n-m)" will have a numeric value of from 0 thru 31 decimal.

This output is to the console terminal and will cause the terminal test routine to error. Therefore if system overload problems are anticipated the operator should not run the console terminal test routine.

When execution is under control of the ACT11 Monitor all devices reported by the test configuration processor are tested and DEVICES that do not respond due to systems overload are reported as DEVICE NOT RUNNING and those devices are shut down.

6.2 Error HALT

If console switch 15 is on the program will HALT at location HALTER following the error type out. If switch 15 is down the program will restart on error.

7.0 RESTRICTIONS

If the line printer was selected for test the restart address is 1000. If 1000 is left in the consol switches when start is pressed the program will assume a new test configuration is desired. In this way the line printer may be deselected and restart address is 200 on the next pass.

7.1 DX11 ONLINE TESTING requires a minimum of 12 Kwords of memory. For testing in 8K word memory systems, the number of devices on line prameter located at symbolic location "NONL" will be modified to equal 1, (by the program).

7.2 PDP-11 SYSTEMS using 8k words of memory and testing low speed doubble buffered communications devices under monitor control (i.e., ACT-11). Depending on the cpu (i.e., mainframe) or type of memory used, it is possible that background processing can be completed in less than a character transfer time of a device being tested. This is due to the fact that monitor mode execution incorporates a QUICK PASS (i.e., suppress iterations) on pass #1, for quick verification of systems. This can result in

"DEVICE NOT RUNNING REPORTS". Should this occur under test, reload CTP using dump mode on the ACT-11 daughter station. Then clear location 42 octal and initialize for test starting at 4.0 user procedure. On 8k word memory systems device not running reports can occur with the setting (i.e.,=1) of dynamic word switch register switches:

11=1 INHIBIT ITERATIONS

9=1 INHIBIT MEMORY TEST FAST READ/WRITE

8=1 INHIBIT MEMORY TEST WORST CASE NOISE

NOTE:

DEVICE NOT RUNNING REPORTS SHOULD NOT
BE IGNORED BUT RESOULVED AS STATED ABOVE.

8.0 MISCELLANIOUS

8.1 Program Run Time

The run time is dependent on the amount of memory on the system and the number of devices selected to run. The minimum run time, with 8K of memory and no devices selected, is about 8 seconds. Add approximately 8 seconds for every 4K of additional memory. Each additional device takes up to about 10% additional time, until 100% of the processor is

used servicing devices, i.e. some large systems will not be able to select all available devices at the same time. A quick Verification pass may be selected by setting switch register switches 08 and 09 inhibit memory tests and switch 11 inhibit iterations.

8.2 For hardware specifications, refer to the PDP-11 Peripheral and interface handbook.

9.0 PROGRAM DESCRIPTION

Following the load address and start sequence the program examines the console switches to see if the start address bit is still up. If so the program assumes that this is the first pass or a new test configuration is desired. If the start address is not in the console switch the program assumes that "no" hardware has been added or removed from the system.

For mechanical devices, such as the TTY reader, there is no automatic re-synchronization if its tape becomes out of phase with the data. It will become necessary to stop the exerciser and manuallly resynchronize the tape and restart the exerciser.

There is a primer area that checks the switch register to see what devices are to be initiated. The primer area sets the interrupt enable bit in the device status register, initializes the data pattern and initiates an operation to raise data flags on devices that can not initiate them themselves. Then the primer jumps to the processor test where the individual devices are serviced at the interrupt rate.

The function of this test is to drive the unibus to the highest possible level of throughput in order to detect malfunctions which might arise from device interaction. It was for this reason that the device selection options are so extensive. This program is "NOT" a PROCESSOR or DEVICE DIAGNOSTIC.

9.1 CLREVEC

This subroutine loads location 000300 through 776 with .+2 and HALT. This is a series of instruction starting at location 0, designed to detect, and isolate unexpected traps and interrupts to the trap and interrupt vector area of memory.

The principle of this routine is: The vector entrance address points to the next sequential word which contains a HALT (00000). (This location is also the status for that

vector entrance, but this has no effect on it also being the next instruction).

If a HALT occurs in the trap or interrupt vector area, register six should be examined to determine the location the program was at, when the interrupt or trap occurred. (Memory as specified by R6 contains the PC of the instruction following this instruction where the trap occurred).

Following the .+2 initialization the emulator vector and start address is initialized. Emulator vector and start address in initialized.

9.2 SYSMAP

The function of this routine is to create a map of all the devices of the system capable of being tested by this program. The program assumes that all devices have their standard address and that all communication devices follow the address and vector assignment scheme specifies by the communication memo "relative vector assignments for communication devices in PDP-11 production systems".

SYSMAP generates ten (10) maps, a one (1) indicates that that device or line exits, e.g. bit 0 up indicates line zero exits.

SY.DC Map of DC11's lines 0-15.
SY.DC Map of DC11's lines 16-31.
SY.KL Map of KL11 lines 0-15.
SY.DP Map of DP11 lines 0-15.
SY.DP Map of DP11 lines 16-31.
SY.DM Map of DM11 units 0-15.
SY.DN Map of DN11 units 0-15.
SY.DL Map of DL11 units 0-15.
SY.DL Map of DL11 units 16-30.
SY.DH Map of DH11 units 0-15.
SY.DJ Map of DJ11 units 0-7.
SY.ANCMAP Map of ancillary devices.
BIT0=KL11 Console TTY
BIT1=LP11 Line Printer
BIT2=TC11 DECtape
BIT3=RF11 Disk
BIT4=RK11 Disk
BIT5=RP11 Disk

9 3 SWITCH

This routine enables the operator to select the system test configuration as per 4.2

9.4 SYSGEN

This routine verifies that all devices selected for test exist. Following this validation, the routine initializes the device vectors to point to the linker area and genrates the linker code. This section of code connects multiple vectors to the device interrupt service routine (ISR). The linker area also contains the line number corresponding to the vector it handles.

9.5 REPRT

This routine was intended to report the hardware and test configuration on the console TTY.

9.6 DEVICE

This routine is the entry point of the program when the swith register is zero. The function of this routine is to initialzie the status registers and data files of those devices selected for test.

9.7 BCKGND

9.7.1 Monitor

When the test configuratin has been selected and as corresponding devices initialized the processor priority is lowered to zero and the devices are serviced. If the ISR's do not require 100% of the processor time (as is the case with 32.DP11) the spare time is used to run a background routine. This routine monitors NPR data files (RF11, TC11) for data errors and silent devices (DC11's, DP11's) to verify that they are in fact running. The switch register is scanned once per pass in background and if SW9=0 (i.e., is reset) CORTST per 9.7.4 is envoked.

In the case of NPR data check the disk and DECtape input files are compared with a master output file.

9.7.2 CORTST (Memory Expansion)

This memory expansion is accomplished by repeating a unique test in unused memory. In the straight line code a test is made to see if extra memory is to be used. If so the memory is filled with the unique test, then the processor test jumps to the start of the expanded code. This code is executed in these memories until the end of the code is reached, then it will return to the normal processor test.

The amount of memory is determind by doing a TST (0)+ until a time out trap occurs. The value in the register at this time is considered to be high memory. 1000(8) bytes are subtracted from this value to leave a buffer at the top of memory, for ACT11 use.

A copy of the rotate byte instruction test is used as the unique test to fill memory. This test is written in position independent code.

9.8 Interrupt Service Routines

9.8.1 FENDX (TC11 Forware End Zone)

FENDZ is the first address in the DEC tape interrupt vector (214). This routine will read, in reverse block numbers until the reverse end zone is found. At this point the interrupt vecotr and command register are modified to read all block number in the forward direction. Each block number read is compared with the expected block number count and miscomparisons reported. When each block is found (with the exception of block 0) a block two hundred fifty six word of test data is written onto tape. After all block numbers have been read the tape is driven into the forward end zone. Here the direction is reversed and ll block numbers are read in reversed. Starting with block 1100 through block 1 the data is read from tape and stored in a storage buffer for comparison. While the I/O routines are inactive a background program compares TC11 read data with TC11 write data and errors are reported. At this point the bell is rung and test restarted.

NOTE:
TC11 DECTAPE DEVICE ADDRESS:

ACT11 = UNIT #1 otherwise UNIT #0 is tested.

9.8.2 DSKVEC (RF11 Disk Service Routine)

This routine is entered from the RF11 interrupt vector, the first section of this routine determines which disk function (write, write check, or read) to perform. Each function is executed in blocks of two hundred and fifty six words. When function has been executed through out the entire disk area the next function is selected and executed in the same manner two data buffers are involved in the disk exerciser, The first (BUFF*) is a two hundred and fifty six word block and serves as output data for RF11 disk and TC11 DECtape. The data file is a symmetrical pattern of N,-N where N=1 through 128, followed by N-1,N where n=128 through 1. The second buffer (INBERF:) is a storage buffer for the disk read function. While the I/O interrupt routines are

inactive a background program continously compares the input buffer with the output buffer.

9.8.3 RKSTART (RK-11 Disk)

This routine performs a write and a write check of the disk. The data that is written on the disk is part of test program code that is never modified. This segment of memory is written in contiguous block thru the disk memory. After the total disk(s) has been written, a write check is used to verify that the data has been written correctly on the disk. Note that no "DATO" are used in exercising the disk (data is not transferred into memory). Ther is a location in the program that if modified will allow exercising up to four disks.

9.8.4 LPVECT (Line Printer Service Routine)

The LP11 line printer service routine is entered through an interrupt vector at location 200. A wedge is formed by printing a continous set of sixty four characters (40 through 137). The first line prints a full row of eighty columns. Then each sucessive line prints one less column until zero is reached and the wedge restarts.

NOTE:
That on successive lines of printer output that the previous lines first character is discarded. This causes the printed text (output) to rotate to the left one character per line.

Because the wedge does not contain a multiple of sixty four characters, sixty four different wedges are printed. If the line printe has a capacity of ninety six characters, location LPSIZE should be changed accordingly.

9.8.5 DC.XMT DC11 Transmitter Service Routine

Each line of the DC11 has separate vecotr for the transmitter and receiver. These vectors point to a unique instruction in the linkr area. This instrcution in a JSR register 5 to the ISR and is followed by the line number. Upon entry to the ISR registers R1 and 2 are saved and the line number is fetched. The line number scaled to form and index to the data for that line and scaled again to form an index to the device status register. The data generated by the transmitter ISR is a binary count pattern 0-377. Since the transmitter is operating in the 5 bits/character mode this pattern appears to the receiver as four patterns of 0-37.

The 5 bit mode was selected to give the highest possible rate of interrupts. This scheme also verifies that the 3

MSB get stripped and that there is no cross talk between bits. The ISR transmits one character per entry and return to the mainline by incrementing R6 and executing an RTI.

9.8.6 DC.RCV DC11 Receiver Service Routine

The entry and exit scheme for the receiver ISR is indentical to that of the transmitter ISR. In this routine the done bit is tested to verify that is is a legitimate interrupt. Bit8 of the receiver status is set indicating to the background monitor that the line has been serviced and a comparison is made between the contents of the receiver date buffer and the expected data (0-37).

Because the DC11 is:
1. Operating in maintenance mode
2. Not double buffered
3. An asynchronous device

Data overrun should never occur as a result of processor time consumed by higher priority deviced.

9.8.7 KL.XMT KL11 Transmitter ISR

KL.XMT services all user KL11's up to sixteen. Because the device and vector addresses of the consol KL11 are not contiguous with the user KL11's a separate routine handles the CTY. KL.XMT is entered through the linker area in order to present a line number to the ISR if interrupt enable and done are set the ISR transmits a character in a binary count pattern (0-147), and exits.

NOTE:
The receiver routine is set up to run in the maintenance mode. This means that is an ASR33 is to be used there must not be any tape in the reader. If the reader is to be tested location KLXSET must be patched to 100.

9.8.8 KL.RCV KL11 Receiver ISR

The entry and exit scheme of the receiver ISR is identical to that of the transmitter. Receiver done and interrupt enable are tested prior to the data check to detect false interrupts. The data test first checks for leader. If the data is not leader it must eithr be a bell (207) or the correct data in the binary pattern (0-147)

9.8.9 Consol KL11 ISR's

The console IRS are entered directly from the console vectors (60-66), and the exit is by RTI data handling is identical tc that of the KL11 users ISR.

9.8.10 DP11 Receiver ISR

The DP11 receiver ISR goes active on 4 syns's and receives and checks a binary count pattern 0-377 then kills active and waits to be resynced.

9.8.11 DP.XMT DP11 Transmitter ISR

The DP transmitter ISR transmitts 4 sync characters and a binary count pattern 0-377. This process continues indefinately unless the system overhead gets too heavy. If this happens RCV O'RUN will set and the transmitter will stop and resync.

9.8.12 DM11 ISR

The DM11 routines first transmitts an all ones character to each DM receiver to determine the character length of each DM. Then a binary count is transmitted in proportion to the character length.

9.8.13 DN11 ISR

The DN routine utilizes the maintainence mode to test the interface logic. After the interrupt has been serived, a software flag is set which signals the backgroung program to transmit the next data when it is ready. This routine only assumes one line per DN11. If an additional line is there, but doesn't work, it may never be detected.

9.8.14 DX11 Offline ISR

The function of the offline DX11 code is to create NPR's at a rate similar to that which would occur while operating online. To accomplish this end a fast Service-In/Service-Out sequence is enabled by setting the SOSIEN (SRVO-SRVI ENABLE) flop.

Following all the table initialization the 360 simulator out lines are loaded with a test data pattern (125) and the byte count and destination address are set. The DX function bits are set to do a 360 WRITE (from the 360 into PDP memory) and the SOSIEN is then set. This causes a fast SERVICE-IN/SERVICE-OUT sequence to take place until the byte count goes to zero. At that time the DONE light is set and the DX11 interrupts to the offline interrupt service routine DX.ISR. In this routine the received data buffer is checked for correct data and then is cleared and the sequence restarted.

Some errors that have been typical are Data Lates on the

RK03 disk and "holes" in either DX or RK data buffers. These "holes" were caused by noise on the M7821's which caused BUS BUSY to drop.

9.8.15 DX11 Online Responder

The online DX11 module of CTP is a responder to a 360 program that allows the PDP-11 system to be exercised in conjunction with the 360 system.

The 360 channel to the DX11 is usually driver by an IBM diagnostic program called FRIEND, which generates an arbitrary CCW string for a particular device (see DX11-B Maintenance Manual for FRIEND operator procedures). The DX11 CTP module recognizes eight 360 addresses, and all 256 commands, and responds to them as follows:

Addresses X0 - X3: Selections accepted (see command responses).

X4 - X7: Selections rejected with unit-check, except for sense, which receives Intervention Required.

Commands Read : Clears Sense byte and transfers 256 byte buffer to 360.

Write : Clears Sense byte and transfers 256 bytes from 360.

Sense : Returns one byte Sense byte to 360 (Sense byte not cleared).

NOP : No operation - Sense byte not altered.

Others : Rejected via Unit-Check. Sense byte set to Command-Reject.

The effect of these operations is that addresses X0 - X3 appear "online" to the 360, and X4 - X7 appear "offline". Also, for the online addresses, Read, Write, Sense, and NOP are legal commands.

FRIEND COMMAND STRING

In order to exercise the DX11 online to the 360, the following command string should be typed to FRIEND:

```
DEV = XXX
WRITE FROM SA
DATA = 256 X ff
READ INTO SB
DL = 256
COMPARE SA, SB
```

30

ERROR DETECTION

No errors are detected by the CTP module. FRIEND detects data errors caused by the DX11 and also the failure of the DX11 to respond (which probably means that the DX11 failed to interrupt).

CTP SETUP

Several program constants may require alteration before CTP is started.

DX11 interrupt priority - default is 200 for BR4. In DX11 interrupts at BR5 or BR6, this constant must be changed.

DX11 control unit address - default is hexadecimal 10 (octal 20). This value should be changed to reflect the jumpered 360 address of the DX11 (see DX11-B Maintenance Manual).

9.8.16 DL11A,B C,D.E

Since each DL11 unit has four registers each requires four addresses. Address space assignments for the DL11A and B are the same as for the KL11; that is, unit 0 occupies addresses 777560-777566, and units 1-15 occupy from 776500 through 776676. For the DL11C,D, and E unit 0 will have address 775610 thru unit 31 at 776170.

The four registers and their addresses are listed for DL11 unit 0, where xx is 756 for DL11A and B, and 561 for DL11C,D,E.

1. RECEIVER STATUS REGISTER (RCSR) 77XXX0
2. RECEIVER DATA BUFFER REGISTER (RBUF) 77XXX2
3. TRANSMITTER STATUS REGISTER (XCSR) 77XXX4
4. TRANSMITTER DATA BUFFER REGISTER (XBUF) 77XXX6

DL11A,B

Are KL compatable devices with 8 bit character, no parity and two stop bit. If one is used for the console teletype it is assigned VECTOR ADDRESS 60 and 64.

9.8.17 DL.XMT DL11 Tranmitter ISR

DL.XMT services all user DL11's up to thirty one. Because

the device and vector addresses of the console DL11A and B are not contiguous with DL11C,D,E's the DL11A and B's are treated as KL11's and a separate routine handles them. DL.XMT is entered through the linker area. Transmitter ready is verified on each entry and a binary processed pattern of (0-37) is tranmitted.

9.8.19 DL.RCV DL11 Receiver ISR

The DL11 is tested in maintenance mode and entry in the receiver ISR is identical to that of the transmitter. The receiver done is tested prior to the data check to detect false interrupts. Each entry into the receiver ISR the DL DEVICE FLAG bit is set in the systems RUN MAP to indicate that the device has been serviced.

9.8.19 DJ.XMT/DJ.RCV Transmitter/Receiver Service Routines

Each DJ11 has a separate Vector for the transmitter and receiver. These vectors point to a UNIQUE instruction in the LINKER AREA. This instruction is a JSR register 5 to the associated ISR and is followed by the device number. On entry into the ISR the device number is fetched and scaled to form a device base address used by the ISR to service that device.

9.8.20 DJ.XMT DJ11 Transmitter ISR

On initial entry bit 15 XMIT READY is tested to detect false interrupts. The line number which requires service is extracted from the transmitter buffer register and used as an index to retrieve its associated character for transmission. The associated character entry is transmitted and then incremented to the next value. A 5 level binary processed data pattern of 0-37 is transmitted. Expanded character level and error report capability has been included, the method of implementation can be found in the form of annotation within the DEVICE ISR program listing. The device CSR register is tested and further line activity is processed as required. A running tally of transmitted characters is recorded in location DJ.XTLY.

9.8.21 DJ.RCV DJ11 Receiver ISR

The DJ11 is tested in maintenance mode and entry into the receiver ISR is identical to that of the transmitter. The RECEIVER DONE bit 7 is tested to detect false interrupts. The received character word is verified at a 16 bit level. i.e., OVERRUN, FRAMING and PARITY errors will result in error display processing. Each entry into the receiver ISR the DJ DEVICE FLAG bit is set in the system RUN MAP to

indicate that the device has been serviced.

10.0 FLOW CHART

11.0 LISTING


```
                        .TITLE  MAINDEC-11-DZQCA-G      COMMUNICATION TEST PROGRAM (CTP)
                        .ABS
                        .ENABLE TIM
                        ;COPYRIGHT 1972, 1973 BY DIGITAL EQUIPMENT CORPORATION
                        ;MAYNARD, MASSACHUSETTS 01754
                        ;PROGRAMMER:    WALT ARMSTRONG
                        ;
                        ;DATA LIGHTS = 1, GENERAL TEST CONFIGURATION ****************************
                        ;HALT ADDRESS 3114
                        ;       SW00 = 1, TEST NON-COMM DEVICES
                        ;       SW01 = 1, TEST DC11 ASYNC LINE UNIT
                        ;       SW02 = 1, TEST KL11 MULTI-USER TTY'S
                        ;       SW03 = 1, TEST DP11 SYNC LINE UNITS
                        ;       SW04 = 1, TEST DM11A ASYNC MUX
                        ;       SW05 = 1, TEST DN11 AUTO CALLING UNITS
                        ;       SW06 = 1, TEST DM11BB MODEM CONTROL MULTIPLEXERS
                        ;       SW07 = 1, TEST KG11A CYCLIC REDUNDANCY CHECK OPTIONS
                        ;       SW08 = 1, TEST DX11
                        ;       SW09 = 1, TEST DL11C,D,E
                        ;       SW10 = 1, TEST DH11 (TO BE ADDED)
                        ;       SW11 = 1, TEST DJ11
                        ;
                        ;DATA LIGHTS = 2, NON-COMM TEST CONFIGURATION ***************************
                        ;HALT ADDRESS 3140
                        ;       SW00 = 1, TEST CTY CONSOL TELETYPE
                        ; ;NOTE: DYNAMIC SWITCH SETTING
                        ;       SW13 MUST BE SELECTED IE = 1
                        ;       TO TEST CTY (CONSOLE TTY) READER
                        ;       SW01 = 1, TEST LP11 LINE PRINTER
                        ;       SW02 = 1, TEST TC11 DECTAPE
                        ;       SW03 = 1, TEST RF11 DISK
                        ;       SW04 = 1, TEST RK11 DISK
                        ;       SW05 = 1, TEST RP11 DISK
                        ;
                        ;DATA LIGHTS = 3, DC11 TEST CONFIGURATION ********************************
                        ;HALT ADDRESS 3164
                        ;       SW00 = 1, TEST DC LINE 0
                        ;       SW01 = 1, TEST DC LINE 1
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST DC LINE 15
                        ;
                        ;DATA LIGHTS = 4, DC11 TEST CONFIGURATION (CONTINUED)
                        ;HALT ADDRESS 3206
                        ;       SW00 = 1, TEST DC LINE 16
                        ;       SW01 = 1, TEST DC LINE 17
                        ;         .
                        ;         .
```

```
;
;       SW15 = 1, TEST DC LINE 31

;DATA LIGHTS = 5, KL11 TEST CONFIGURATION ********************************
;HALT ADDRESS 3232
;       SW00 = 1, TEST KL LINE 0
```

```
                        ;       SW01 = 1, TEST KL LINE 1
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST KL LINE 15

                        ;DATA LIGHTS = 6, DP11 TEST CONFIGURATION ********************************
                        ;HALT ADDRESS 3256
                        ;       SW00 = 1, TEST DP LINE 0
                        ;       SW01 = 1, TEST DP LINE 1
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST DP LINE 15

                        ;DATA LIGHTS = 7, DP11 TEST CONFIGURATION (CONTINUED)
                        ;HALT ADDRESS 3300
                        ;       SW00 = 1, TEST DP LINE 16
                        ;       SW01 = 1, TEST DP LINE 17
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST DP LINE 31

                        ;DATA LIGHTS = 10, DM11A TEST CONFIGURATION ******************************
                        ;HALT ADDRESS 3324
                        ;       SW00 = 1, TEST DM11A #0 (LINES 0-15)
                        ;       SW01 = 1, TEST DM11A #1 (LINES 16-31)
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST DM11A #15 (LINES 240-255)

                        ;DATA LIGHTS = 11, DN11 TEST CONFIGURATION ********************************
                        ;HALT ADDRESS 3350
                        ;       SW00 = 1, TEST DN11 #0 (LINES 0-3)
                        ;       SW01 = 1, TEST DN11 #1 (LINES 4-7)
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST DN11 #15 (LINES 60-63)

                        ;DATA LIGHTS = 12 DM11BB TEST CONFIGURATION ******************************
                        ;HALT ADDRESS 3374
                        ;       SW00 = 1, TEST DM1186 #0
                        ;       SW01 = 1, TEST DM11BB #1
                        ;         .
                        ;         .
                        ;
                        ;       SW15 = 1, TEST DM11BB #15

                        ;DATA LIGHTS = 13, KG11A TEST CONFIGURATION ******************************
                        ;HALT ADDRESS 3420
                        ;       SW00 = 1, TEST KG11 #0
                        ;       SW01 = 1, TEST KG11 #1
                        ;         .
```

```
113                                     ;          .
114                                     ;          .
115                                     ;       SW07 = 1, TEST KG11 #7
116                                     ;
117                                     ;DATA LIGHTS = 14, DX11 TEST CONFIGURATION ********************************
118                                     ;HALT ADDRESS 3444
119                                     ;       SW00 = 1, TEST DX11 #0
120                                     ;
121                                     ;       SW08 = 1, ONLINE TEST OF DX11 #0
122                                     ;
123                                     ;NOTE:
124                                     ;       FOR DX11 ONLINE TEST SELECTION SEE RESTRICTIONS
125                                     ;       7.1 LISTING ANNOTATION AT BEGINING OF THIS MAINDEC
126                                     ;
127                                     ;
128                                     ;       DATA LIGHTS = 177400, DX11 #0 CU ADDRESS
129                                     ;HALT ADDRESS 3512
130                                     ;
131                                     ;DATA LIGHTS = 15, DL11C,D,E TEST CONFIGURATION ****************************
132                                     ;HALT ADDRESS 3550
133                                     ;       SW00 = 1, TEST DL11 LINE #0
134                                     ;       SW01 = 1, TEST DL11 LINE #1
135                                     ;          .
136                                     ;          .
137                                     ;
138                                     ;       SW15 = 1, TEST DL11 LINE #15
139                                     ;
140                                     ;DATA LIGHTS = 16, DL11C,D,E TEST CONFIGURATION (CONTINUED)
141                                     ;HALT ADDRESS 3572
142                                     ;       SW00 = 1, TEST DL11 LINE #16
143                                     ;       SW01 = 1, TEST DL11 LINE #17
144                                     ;          .
145                                     ;          .
146                                     ;
147                                     ;       SW14 = 1, TEST DL11 LINE #30
148                                     ;
149                                     ;DATA LIGHTS = 200, DJ11 TEST CONFIGURATION
150                                     ;HALT ADDRESS 3620
151                                     ;       SW00 = 1, TEST DJ11 #0
152                                     ;          .
153                                     ;          .
154                                     ;
155                                     ;       SW07 = 1, TEST DJ11 #7
156                                     ;
157                                     ;DATA LIGHTS = 20, DJ11 #0 LINE TEST CONFIGURATION SELECTION *********
158                                     ;HALT ADDRESS 3644
159                                     ;
160                                     ;       SW00 = 1,TEST DJ11 #0 LINE #0
161                                     ;          .
162                                     ;          .
163                                     ;
164                                     ;       SW15 = 1,TEST DJ11 #0 LINE #15
165                                     ;
166                                     ;
167                                     ;
168                                     ;DATA LIGHTS = 21, DJ11 #1 LINE TEST CONFIGURATION SELECTION *********
```

```
                                ;HALT ADDRESS 3670
                                ;
                                ;       SW00 = 1,TEST DJ11 #1 LINE #0
                                ;         .
                                ;         .
                                ;         .
                                ;       SW15 = 1,TEST DJ11 #1 LINE #15
                                ;
                                ;
                                ;DATA LIGHTS = 22, DJ11 #2 LINE TEST CONFIGURATION SELECTION *********
                                ;HALT ADDRESS 3714
                                ;
                                ;       SW00 = 1,TEST DJ11 #2 LINE #0
                                ;         .
                                ;         .
                                ;         .
                                ;       SW15 = 1,TEST DJ11 #2 LINE #15
                                ;
                                ;
                                ;DATA LIGHTS = 23, DJ11 #3 LINE TEST CONFIGURATION SELECTION *********
                                ;HALT ADDRESS 3740
                                ;
                                ;       SW00 = 1,TEST DJ11 #3 LINE #0
                                ;         .
                                ;         .
                                ;         .
                                ;       SW15 = 1,TEST DJ11 #3 LINE #15
                                ;
                                ;
                                ;DATA LIGHTS = 24, DJ11 #4 LINE TEST CONFIGURATION SELECTION *********
                                ;HALT ADDRESS 3764
                                ;
                                ;       SW00 = 1,TEST DJ11 #4 LINE #0
                                ;         .
                                ;         .
                                ;         .
                                ;       SW15 = 1,TEST DJ11 #4 LINE #15
                                ;
                                ;
                                ;DATA LIGHTS = 25, DJ11 #5 LINE TEST CONFIGURATION SELECTION *********
                                ;HALT ADDRESS 4010
                                ;
                                ;       SW00 = 1,TEST DJ11 #5 LINE #0
                                ;         .
                                ;         .
                                ;         .
                                ;       SW15 = 1,TEST DJ11 #5 LINE #15
                                ;DATA LIGHTS = 26, DJ11 #6 LINE TEST CONFIGURATION SELECTION *********
                                ;HALT ADDRESS 4034
                                ;       SW00 = 1,TEST DJ11 #6 LINE #0
                                ;         .
                                ;         .
```

```
                        ;
                        ;       SWI5 = 1,TEST DJ11 #6 LINE #15



                        ;DATA LIGHTS = 27, DJ11 #7 LINE TEST CONFIGURATION SELECTION *********
                        ;HALT ADDRESS 4060

                        ;       SW00 = 1,TEST DJ11 #7 LINE #0
                        ;         .
                        ;         .
                        ;
                        ;       SWI5 = 1,TEST DJ11 #7 LINE #15


                        ;DATA LIGHTS = 177777, DYNAMIC SWITCH SETTING ****************************
                        ;HALT ADDRESS 4176

                        ;NOTE:
                        ;       SW08  = 1 INHIBIT MEMORY TEST WORST CASE NOISE

                        ;       SW09 = 1, INHIBIT MEMORY TEST FAST  READ WRITE
                        ;       SW10 = 1, BELL ON ERROR
                        ;            0, BELL ON PASS COMPLETED
                        ;NOTE: SW11 SELECTION MAY RESULT IN DEVICE NOT RUNNING REPORT

                        ;       SW11 = 1, INHIBIT ITERATIONS

                        ;       SW13 = 1, INHIBIT ERROR TYPEOUT
                        ;NOTE:  SW13 MUST BE SELECTED IE = 1
                        ;       TO TEST CTY (CONSOLE TTY)

                        ;ACT11: SW13 = 1 INHIBIT SHUTDOWN OF DEVICE(S) NOT RUNNING

                        ;       THE FOLLOWING CTY (CONSOLE TTY) REPORT WILL
                        ;       CONSTITUTE A PASS WHEN RUN UNDER THE ACT11
                        ;       MONITOR:

                        ;               DZQCA-G TESTED WITH
                        ;               SYSTEM CONFIGURATION
                        ;               ETC.


                        ;       SW14 = 1, SCOPE LOOP
                        ;       SW15 = 1, HALT ON ERROR !
                        ;
                        ;DEVICE FIRST    #VECTOR VECTOR
                        ;TYPE   ADDRESS  WORDS   OFFSET

                        ;DC11   174000     4        10
                        ;KL11   176500     4        10
                        ;DP11   174770     4        10
                        ;DM11   175000     4        10
                        ;DN11   175200     2        10
                        ;DMB11  170500     2         4
                        ;KG11   170700     0         0
```

```
                                        ;DR11    167770      4          10
                                        ;PAR11   172600      2          4
                                        ;PAP11   172700      2          4
                                        ;DT11    177420      4          10
                                        ;DX11    176200      4          10
                                        ;DLC11   175610      4          10
                                        ;DJ11    160010      4          10


                                        ;NOTE:

                                        ;       IT IS ASSUMED THAT ALL DEVICE DIAGNOSTICS HAVE BEEN TESTED

                                        ;       ERROR FREE PRIOR TO EXECUTION OF DZQCA-G (CTP)
```

```
                                        .EQUALITIES
000001                                  BIT0 =  000001
000002                                  BIT1 =  000002
000004                                  BIT2 =  000004
000010                                  BIT3 =  000010
000020                                  BIT4 =  000020
000040                                  BIT5 =  000040
000100                                  BIT6 =  000100
000200                                  BIT7 =  000200
000400                                  BIT8 =  000400
001000                                  BIT9 =  001000
002000                                  BIT10 = 002000
004000                                  BIT11 = 004000
010000                                  BIT12 = 010000
020000                                  BIT13 = 020000
040000                                  BIT14 = 040000
100000                                  BIT15 = 100000
000001                                  SW00 =  000001
000002                                  SW01 =  000002
000004                                  SW02 =  000004
000010                                  SW03 =  000010
000020                                  SW04 =  000020
000040                                  SW05 =  000040
000100                                  SW06 =  000100
000200                                  SW07 =  000200
000400                                  SW08 =  000400
001000                                  SW09 =  001000
002000                                  SW10 =  002000
004000                                  SW11 =  004000
010000                                  SW12 =  010000
020000                                  SW13 =  020000
040000                                  SW14 =  040000
100000                                  SW15 =  100000
000400                                  SW8 = SW08
000200                                  LEVEL4= 200
000240                                  LEVEL5= 240
000300                                  LEVEL6= 300
000340                                  LEVEL7= 340
000000                                  R0 =    %0
000001                                  R1 =    %1
000002                                  R2 =    %2
000003                                  R3 =    %3
000004                                  R4 =    %4
000005                                  R5 =    %5
000006                                  R6 =    %6
000007                                  R7 =    %7
000005                                  TTY =   %5
000006                                  SP =    %6
000007                                  PC =    %7
177774                                  SLR =   177774
177776                                  PS =    177776
177570                                  SWR =   177570
177570                                  DISPLAY=SWR
104400                                  SCOPE = TRAP
000000                                  HERE =  0
```

```
000240                  NUP =   240
000000                  OPEN =  0
104000                  HLT =   EMT             ;ERROR REPORT ROUTINE
000004                  TYPE =  IOT
166000                  .BIT =  166000
000207                  BELL =  207
```

```
                                ;DEVICE CONTROL TABLE ENTRY DEFNS (DCT)

000000                          REQ=0                   ;CURRENT REQUEST
000002                          LREQ=2                  ;LAST REQUEST
000004                          DEVSTA=4                ;DEVICE STATE
000006                          ONLF=6                  ;ONLINE FLAG
000010                          SNS=10                  ;SENSE BYTE
000012                          BUFA=12                 ;BUFFER ADDRESS
000014                          BUFC=14                 ;BUFFER BYTE COUNT
000016                          STS=16                  ;STATUS BYTE
000020                          DXBF=20                 ;DATA BUFFER AREA
000420                          DCTZ=20+256.

                                ;REGISTER DEFNS FOR DX11 CODE

000000                          DCT=%0                  ;CURRENT DCT BASE (BACKGROUND TASK)
000001                          TTP=%1                  ;CURRENT TUMBLE TABLE POINTER (INTERRUPT
000002                          T1=%2                   ;WORK REGISTER (BACKGROUND)
000003                          T2=%3                   ;WORK REGISTER (BACKGROUND)
000004                          T3=%4                   ;WORK REGISTER (BACKGROUND)
000005                          W=%5                    ;DCT BASE (INTERRUPT)
000016                          STS=16                  ;STATUS BYTE
                                ;DX DEFNS

000002                          CUART=2
000003                          CUCRT=3

000001                          GO=1
001000                          ONLINA=1000
020000                          ENDEN=20000
000100                          IE=100
000200                          DONE=200
000005                          FCTNW=5
000003                          FCTNR=3
000007                          FCTNS=7
004000                          BSYEN=4000
010000                          SMEN=10000
000400                          CUBSY=400
000010                          ISSREJ=10
000004                          CMDCHN=4

010000                          SYSRST=10000
000002                          STKSTB=2
000100                          ESEND=100
001000                          CHENDS=1000
002000                          UCHKS=2000
000200                          CHIS=200
004000                          INFDSC=4000
000020                          CUDEND=20
000040                          CHDEND=40

000002                          UC=2
000010                          CE=10
000004                          DE=4
```

```
000100                  SM=100

000040                  CUE=40
000004                  SENSE=4

000200                  CMDREJ=200
000100                  INTREQ=100

                        ;REQUEST CODES

000000                  RNULL=0                 ;NO REQUEST
000001                  RINP=1                  ;REQUEST INPUT
000002                  ROUTP=2                 ;REQUEST OUTPUT
000003                  RSTS=3                  ;REQUEST STATUS
000004                  RCUE=4                  ;REQUEST CUE

                        ;DEVICE STATE CODES

000000                  IDLE=0                  ;IDLE

000001                  DATA=1                  ;DATA TRANSFER OR ES VALID

000002                  STA=2                   ;ES REQUIRED

000003                  CHAIN=3                 ;COMMAND CHAINING INDICATED

                                                ;INTERRUPT VECTOR ADDRESS

                                                ;INT ROUTINE
                                                ;OPERATING STATUS
```

```
                                        ;TRAP INITIALIZATION

                000000                  . =     0                       ;TRAP CATCHER FROM 0-776
                                1.8
                000020                  . =     20
000020  000020  023450  000000                  IOTS,   0       ;IOT TRAP VECTOR (20)
000024  000024  024074  000340                  PDOWNS, 340     ;POWER FAIL INTERUPT VECTOR (24,
000030  000030  023210  000340                  HLTS,   340     ;EMULATOR TRAP VECTOR (30)
000034  000034  023750  000340                  TRAPS,  340     ;TRAP VECTOR (34)

                                        ;START ADDRESS INITIALIZATION
                000200                  . =     200
000200  000200  000167  001476          4.9 START:  JMP     BEGIN

                                        ;RESTART ADDRESS IF LINE PRINTER IS TESTED
                001000                  . =     1000
001000  001000  000167  000676          4.9 RSTART: JMP     BEGIN

                                        ;CTP OVERLAY LINKAGE ENTRIES

                001020                  .=      1020            ;FOREGROUND OVERLAY
001020  001020  000000                  OVINIT: 0               ;INITIALIZATION LINKAGE POINTER

                001022                  .=      1022            ;FOREGROUND OVERLAY
001022  001022  000000                  OVPRIM: 0               ;DEVICE PRIMER LINKAGE POINTER

                                        ;NOTE:

                                        ;       CTP WILL ACCOMADATE FOREGROUND OVERLAY'S FOR DEVICES
                                        ;       WHICH ARE NOT NORMALLY TESTED WITHIN CTP ITSELF.

                001024                  .=      1024
001024  001024  000000                  CLINK:  0               ;MONITOR CONTROL ENTRY

                001026                  .=      1026            ;NEXT AVAILABLE FLOATING VECTOR ADDRESS GLOBAL
001026  001026  000300                  FVECT:  300             ;DEFAULT = BASE
```

```
                    001200                          .=1200
001200  000000                                      ICNT:   0               ;ITERATION COUNT
001202  000000                                      ERRORS: 0               ;NUMBER OF ERRORS
001204  000000  000000                              PASSES: 0,0             ;NUMBER OF PASSES

                    000017                          MAPSIZ = 15.            ;CONSTANT TO KEEP TRACK OF MAP SIZE

                    000001                          FL.ANC= 000001
                    000002                          FL.DC = 000002
                    000004                          FL.KL = 000004
                    000010                          FL.DP = 000010
                    000020                          FL.DMA= 000020
                    000040                          FL.DN = 000040
                    000100                          FL.DMB= 000100
                    000200                          FL.KG = 000200
                    000400                          FL.DX = 000400
                    001000                          FL.DLC= 001000
                                                    ;FL.DH= 002000
                    004000                          FL.DJ = 004000
                    000001                          FL.CTY= 000001
                    000002                          FL.LP = 000002
                    000004                          FL.TC = 000004
                    000010                          FL.RF = 000010
                    000020                          FL.RK = 000020
                    000040                          FL.RP = 000040

001210  000000                                      SY.MAP: 0               ;SYSTEM CONFIGURATION MAP
001212  000000                                      SY.ANC: 0
001214  000000                                      SY.DC1: 0
001216  000000                                      SY.DC2: 0
001220  000000                                      SY.KL:  0
001222  000000                                      SY.DP1: 0
001224  000000                                      SY.DP2: 0
001226  000000                                      SY.DMA: 0
001230  000000                                      SY.DN:  0
001232  000000                                      SY.DMB: 0
001234  000000                                      SY.KG:  0
001236  000000                                      SY.DX:  0
001240  000000                                      SY.DL1: 0
001242  000000                                      SY.DL2: 0
001244  000000                                      SY.DJ:  0

001246  000000                                      SW.MAP: 0               ;DEVICES SELECTED FOR TEST MAP
001250  000000                                      SW.ANC: 0
001252  000000                                      SW.DC1: 0
001254  000000                                      SW.DC2: 0
001256  000000                                      SW.KL:  0
001260  000000                                      SW.DP1: 0
001262  000000                                      SW.DP2: 0
001264  000000                                      SW.DMA: 0
001266  000000                                      SW.DN:  0
001270  000000                                      SW.DMB: 0
001272  000000                                      SW.KG:  0
001274  000000                                      SW.DX:  0
001276  000000                                      SW.DL1: 0
```

```
                                SW.DL2: 0
                                SW.DJ:  0


                                RU.MAP: 0               ;DEVICES RUNNING MAP
                                RU.ANC: 0
                                RU.DC1: 0
                                RU.DC2: 0
                                RU.KL:  0
                                RU.DP1: 0
                                RU.DP2: 0
                                RU.DMA: 0
                                RU.DN:  0
                                RU.DMB: 0
                                RU.KG:  0
                                RU.DX:  0
                                RU.DL1: 0
                                RU.DL2: 0
                                RU.DJ:  0

                                MAP:
                                ;BIT11  BIT10   BIT9   BIT8   BIT7   BIT6    BIT5   BIT4   BIT3   BIT2   BIT1
                                ;DJ11   DH11    DL11C  DX11   KG11   DM11BB  DN11   DM11A  DP11   KL11   DC11
                                ;                DL11D                                                 DL11A
                                ;                DL11E                                                 DL11B
                                        0               ;MONITOR MAP FOR DEVICE UNIT #0
                                        0               ;MONITOR MAP FOR DEVICE UNIT #1
                                        0               ;MONITOR MAP FOR DEVICE UNIT #2
                                        0               ;MONITOR MAP FOR DEVICE UNIT #3
                                        0               ;MONITOR MAP FOR DEVICE UNIT #4
                                        0               ;MONITOR MAP FOR DEVICE UNIT #5
                                        0               ;MONITOR MAP FOR DEVICE UNIT #6
                                        0               ;MONITOR MAP FOR DEVICE UNIT #7
                                        0               ;MONITOR MAP FOR DEVICE UNIT #10
                                        0               ;MONITOR MAP FOR DEVICE UNIT #11
                                        0               ;MONITOR MAP FOR DEVICE UNIT #12
                                        0               ;MONITOR MAP FOR DEVICE UNIT #13
                                        0               ;MONITOR MAP FOR DEVICE UNIT #14
                                        0               ;MONITOR MAP FOR DEVICE UNIT #15
                                        0               ;MONITOR MAP FOR DEVICE UNIT #16
                                        0               ;MONITOR MAP FOR DEVICE UNIT #17
                                        0               ;MONITOR MAP FOR DEVICE UNIT #20
                                        0               ;MONITOR MAP FOR DEVICE UNIT #21
                                        0               ;MONITOR MAP FOR DEVICE UNIT #22
                                        0               ;MONITOR MAP FOR DEVICE UNIT #23
                                        0               ;MONITOR MAP FOR DEVICE UNIT #24
                                        0               ;MONITOR MAP FOR DEVICE UNIT #25
                                        0               ;MONITOR MAP FOR DEVICE UNIT #26
                                        0               ;MONITOR MAP FOR DEVICE UNIT #27
                                        0               ;MONITOR MAP FOR DEVICE UNIT #30
                                        0               ;MONITOR MAP FOR DEVICE UNIT #31
                                        0               ;MONITOR MAP FOR DEVICE UNIT #32
                                        0               ;MONITOR MAP FOR DEVICE UNIT #33
                                        0               ;MONITOR MAP FOR DEVICE UNIT #34
                                        0               ;MONITOR MAP FOR DEVICE UNIT #35
                                        0               ;MONITOR MAP FOR DEVICE UNIT #36
```

```
  595  001440  000000                        0               ;MONITOR MAP FOR DEVICE UNIT #37
  596
  597                                 :SYSTEM MAPS OF NON-COMM FLOATING VECTOR DEVICES
  598  001442  000000                 SY.DR1: 0               ;MAP OF DR11A AND DR11C
  599  001444  000000                 SY.DR2: 0
  600  001446  000000                 SY.PAR: 0               ;MAP OF PA611 READERS
  601  001450  000000                 SY.PAP: 0               ;MAP OF PA611 PUNCHES
  602  001452  000000                 SY.DT:  0               ;MAP OF DT11
  603  001454  000000                 SY.NXT: 0               ;MAP NEXT
  604
  605  001456  177777                 SW.DJ0: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #0
  606  001460  177777                 SW.DJ1: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #1
  607  001462  177777                 SW.DJ2: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #2
  608  001464  177777                 SW.DJ3: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #3
  609  001466  177777                 SW.DJ4: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #4
  610  001470  177777                 SW.DJ5: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #5
  611  001472  177777                 SW.DJ6: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #6
  612  001474  177777                 SW.DJ7: 177777          ;LINE ACTIVITY SWITCHES FOR DJ11 #7
  613
  614  001476  000000                 ENDVEC: 0               ;END OF VECTOR AREA
  615  001500  031424                 ENDLNK: LINKER          ;END OF LINKER AREA
  616  001502  000000                 ENDTAB: 0               ;END OF DM11 TABLES
  617  001504  000000                 ENDCOR: 0               ;END OF USEABLE CORE
  618
  619  001506  000000                 NO.DC:  0               ;NUMBER OF DC11'S
  620  001510  000000                 NO.KL:  0               ;NUMBER OF KL11'S
  621  001512  000000                 NO.DP:  0               ;NUMBER OF DP11'S
  622  001514  000000                 NO.DMA: 0               ;NUMBER OF DM11A'S
  623  001516  000000                 NO.DN:  0               ;NUMBER OF DN11'S
  624  001520  000000                 NO.DMB: 0               ;NUMBER OF DM11BB'S
  625  001522  000000                 NO.KG:  0               ;NUMBER OF KG11'S
  626  001524  000000                 NO.DR:  0               ;NUMBER OF DR11'S
  627  001526  000000                 NO.PAR: 0               ;NUMBER OF PA611 READERS
  628  001530  000000                 NO.PAP: 0               ;NUMBER OF PA611 PUNCHES
  629  001532  000000                 NO.DT:  0               ;NUMBER OF DT11'S
  630  001534  000000                 NO.DX:  0               ;NUMBER OF DX11'S
  631  001536  000000                 NO.DLC: 0               ;NUMBER OF DL11C'S
  632  001540  000000                 NO.DJ:  0               ;NUMBER OF DJ11'S
  633
  634  001542  000040                 MX.DC:  32.             ;MAXIMUM NUMBER OF DC11'S ALLOWABLE
  635  001544  000020                 MX.KL:  16.             ;MAXIMUM NUMBER OF KL11'S ALLOWABLE
  636  001546  000040                 MX.DP:  32.             ;MAXIMUM NUMBER OF DP11'S ALLOWABLE
  637  001550  000020                 MX.DMA: 16.             ;MAXIMUM NUMBER OF DM11A'S ALLOWABLE
  638  001552  000020                 MX.DN:  16.             ;MAXIMUM NUMBER OF DN11'S ALLOWABLE
  639  001554  000020                 MX.DMB: 16.             ;MAXIMUM NUMBER OF DM11BB'S ALLOWABLE
  640  001556  000020                 MX.KG:  16.             ;MAXIMUM NUMBER OF KG11'S ALLOWABLE
  641  001560  000040                 MX.DR:  32.             ;MAXIMUM NUMBER OF DR11'S ALLOWABLE
  642  001562  000020                 MX.PAR: 16.             ;MAXIMUM NUMBER OF PA611 READERS ALLOWABLE
  643  001564  000020                 MX.PAP: 16.             ;MAXIMUM NUMBER OF PA611 PUNCHES ALLOWABLE
  644  001566  000010                 MX.DT:  8.              ;MAXIMUM NUMBER OF DT11'S ALLOWABLE
  645  001570  000004                 MX.DX:  4.              ;MAXIMUM NUMBER OF DX11'S ALLOWABLE
  646  001572  000037                 MX.DLC: 31.             ;MAXIMUM NUMBER OF DL11'S ALLOWABLE
  647  001574  000010                 MX.DJ:  8.              ;MAXIMUM NUMBER OF DJ11'S ALLOWABLE
  648  001576  000000                 MX.NEXT: 0              ;ADDITIONAL ENTRIES
```

```
 649
 650  001600  174000                    AD.DC:  174000          ;ADR OF FIRST DC11
 651  001602  176500                    AD.KL:  176500          ;ADR OF FIRST KL11, DL11A, DL11B
 652  001604  174770                    AD.DP:  174770          ;ADR OF FIRST DP11
 653  001606  175000                    AD.DMA: 175000          ;ADR OF FIRST DM11A
 654  001610  175200                    AD.DN:  175200          ;ADR OF FIRST DN11
 655  001612  170500                    AD.DMB: 170500          ;ADR OF FIRST DM11BB (NO VECTOR REQUIRED)
 656  001614  170700                    AD.KG:  170700          ;ADR OF FIRST KG11   (NO VECTOR REQUIRED)
 657  001616  167770                    AD.DR:  167770          ;ADR OF FIRST DR11A, DR11C
 658  001620  172600                    AD.PAR: 172600          ;ADR OF FIRST PA611 READER
 659  001622  172700                    AD.PAP: 172700          ;ADR OF FIRST PA611 PUNCH
 660  001624  177420                    AD.DT:  177420          ;ADR OF FIRST DT11
 661  001626  176200                    AD.DX:  176200          ;ADR OF FIRST DX11
 662  001630  175610                    AD.DLC: 175610          ;ADR OF FIRST DL11C, DL11D, DL11E
 663  001632  160010                    AD.DJ:  160010          ;ADR OF FIRST DJ11
 664
 665                                    ;***    NOTE:
 666                                    ;MODIFY (AD.???) TO 150000 TO REMOVE THAT TYPE DEVICE FROM THE CONFIGURATION.
 667                                    ;MODIFY (AD.???) TO 174000 TO ALLOW UNCUT M7821 TO BE USED
 668
 669  001634  000240                    BR.DC:  240             ;PRIORITY = 5 FOR DC11
 670  001636  000200                    BR.KL:  200             ;PRIORITY = 4 FOR KL11, DL11A, DL11B
 671  001640  000240                    BR.DP:  240             ;PRIORITY = 5 FOR DP11
 672  001642  000240                    BR.DMA: 240             ;PRIORITY = 5 FOR DM11A
 673  001644  000200                    BR.DN:  200             ;PRIORITY = 4 FOR DN11
 674  001646  000200                    BR.DMB: 200             ;PRIORITY = 4 FOR DM11BB
 675  001650  000200                    BR.DX:  200             ;PRIORITY = 4 FOR DX11
 676  001652  000200                    BR.DLC: 200             ;PRIORITY = 4 FOR DL11C,D,E
 677  001654  000240                    BR.DJ:  240             ;PRIORITY = 5 FOR DJ11
 678  001656  000200                    BR.CTY: 200
 679  001660  000200                    BR.LP:  200
 680  001662  000300                    BR.TC:  300
 681  001664  000240                    BR.RF:  240
 682  001666  000240                    BR.RK:  240
 683  001670  000240                    BR.RP:  240
 684
 685  001672  000300                    FIRSTV: 300             ;ADDRESS OF FIRST FLOATING VECTOR
 686  001674  000104                    KLXSET: 104             ;PATCH TO 100 TO TEST THE ASR33 READER
 687
 688  001676  176504                    AD.KLX: 176504          ;ADDRESS OF FIRST KL XMIT REGISTER
 689  001700  175614                    AD.DLX: 175614          ;ADDRESS OF FIRST DL11C,D,E XMIT REGISTER
```

```
001702  012767  000340  176066   6.4  BEGIN:  MOV   #340,    PS      ;PRIORITY =7
001710  012706  001200           3.8          MOV   #ICNT,   SP      ;STACK POINTER = ICNT
001714  005037  000006           3.7          CLR   @#6              ;TRAP CATCHER
001720  012737  001734  000004   5.2          MOV   #BEGINX,@#4      ;SET
001726  012737  000400  177774   5.2          MOV   #400,    @#SLR   ;STACK LIMIT REGISTER 11/40 OR 11/45
001734  012737  000006  000004   5.2  BEGINX: MOV   #6,      @#4     ;+2   STACK OVERRUN
001742  005067  177234           4.9          CLR   ERRORS           ;CLR ERROR COUNT
001746  005067  177232           4.9          CLR   PASSES           ;CLR PASS COUNT
001752  005067  000756           4.9          CLR   RPTFLG           ;CLR REPORT CONFIGURATION CONTROL FLAG
001756  022737  023450  000020   4.7          CMP   #IOT$,   @#20    ;TEST FOR OVERLAY
001764  001406                   2.6          BEQ   1$               ;BRANCH IF NONE
001766  013767  000020  007750   6.4          MOV   @#20,    IOTSAV  ;SAVE OVERLAY ADDRESS
001774  012737  023450  000020   5.2          MOV   #IOT$,   @#20    ;RESTORE TYPE ROUTINE ADDRESS
002002  005037  000022           3.7  1$:     CLR   @#22             ;MAKE SURE TYPE PRIORITY IS LOW

002006  005737  000042           3.2          TST   @#42             ;CHECK ACT11 MONITOR
002012  001004                   2.6          BNE   2$               ;YES BRANCHES

002014  032767  001200  175546   6.5          BIT   #1200,   SWR     ;NEW SYSTEM CONFIGURATION
                                      ;
                                      ;THE START OR RESTART ADDRESS SHOULD BE LEFT IN THE SWITCHES IF
                                      ;THIS IS THE FIRST PASS SINCE THE PROGRAM HAS BEEN LOADED OR
                                      ;IF THERE HAS BEEN ANY HARDWARE ADDED OR REMOVED.
                                      ;
002022  001413                   2.6          BEQ   DVICE            ;NO, INITIALIZE DEVICES AS PER
                                                                       ;LAST SWITCH SETTINGS
002024  013767  000042  176772   6.4  2$:     MOV   @#42,    CLINK   ;SET MONITOR QUICK PASS CONTROL
002032  004767  000030           7.0          JSR   PC,      CLRVEC  ;LOAD VECTOR AREA WITH .+2, IOT
002036  004767  000066           7.0          JSR   PC,      SYSMAP  ;DETERMIN SYSTEM CONFIGURATION
002042  004767  000774           7.0          JSR   PC,      SWITCH  ;DETERMIN TEST CONFIGURATION FROM SWITCHES
002046  004767  002132           7.0          JSR   PC,      SYSGEN  ;INITIALIZE VECTOR AREA AS PER TEST CONF.
002052  004767  003036           7.0  DVICE:  JSR   PC,      DEVICE  ;INITIALIZE DEVICES AS PER TEST CONFIGURATION
002056  004767  006670           7.0          JSR   PC,      BCKGND  ;RUN BACKGROUND PROGRAM TO
                                                                       ;MONITOR SILENT DEVICES AND NPR
                                                                       ;DATA FILES
002062  000773                   2.6          BR    DVICE            ;LOOP

002064  000000                   1.8          HALT                   ;HALT HERE SIGNIFIES RTS FAILURE
```

```
                                        ;*********************CLRVEC*********************************

                                        ;CLRVEC, ROUTINE TO FILL COMMUNICATION VECTOR AREA WITH
                                        ;       .+2
                                        ;       HALT

                                        ;*********************CLRVEC*********************************

002066  012702  000300          3.8   CLRVEC: MOV     #300,R2          ;R2 COMM VECTOR AREA ADRS
002072  012701  000302          3.8           MOV     #302,R1          ;INIT R1 WITH ADRS OF HALT
002076  010122                  3.7   CV1:    MOV     R1,     (R2)+    ;MOVE .+2 INTO VECTOR
002100  005022                  3.7           CLR     (R2)+            ;MOVE HALT INTO VECTOR + 2
002102  022121                  4.7           CMP     (R1)+, (R1)+     ;INC TO NEXT VECTOR AREA
002104  022701  001000          3.8           CMP     #1000, R1        ;END OF VECTOR AREA
002110  003372                  2.6           BGT     CV1              ;NO
002112  012767  000137  176060  6.4           MOV     #137,200         ;REINIT START ADRS
002120  012767  001702  176054  6.4           MOV     #BEGIN,202       ;  "      "   "
002126  000207                  3.5           RTS     PC               ;RETURN

                                        ;*********************CLRVEC*********************************
```

```
                                        ;********************** SYSMAP ************************************
                                        ;SYSMAP, SYSTEM MAPING ROUTINE
                                        ;THE FUNCTION OF THIS ROUTINE IS TO DETERMINE WHAT COMMUNICATION
                                        ;OPTIONS EXIST ON THE MACHINE UNDER TEST AND WHAT
                                        ;"OTHER" PERPHERIALS CAN BE RUN IN CONJUNCTION WITH THE COMM EQUIP.
                                        ;"OTHER OPTIONS ARE:  RF11 DKSK, TC11 DECTAPE, LP11 LINE PRINTER AND
                                        ;KL11 CONSOLE TTY
                                        ;********************** SYSMAP ************************************
002130  004567  020712          7.0   SYSMAP: JSR     %5,CLEAR        ;CLEAR MONOTOR MAPS
002134  001210                                SY.MAP                  ;START HERE
002136  000122                                MAPSIZ*3+40+5           ;START ADDRESS FIVE TABLES
002140  012700  001600          3.8           MOV     #AD.DC, R0      ;GET ADDRESS TABLE POINTER
002144  012702  001214          3.8           MOV     #SY.DC1,R2      ;GET SYSTEM MAP POINTER
002150  012703  001506          3.8           MOV     #NO.DC, R3      ;SET R3 = FIRST DEVICE COUNT
002154  012704  001542          3.8           MOV     #MX.DC, R4
002160  012767  003020  175616  6.4           MOV     #NEXT,4         ;SET UP TIME OUT VECTOR
002166  012767  000340  175612  6.4           MOV     #340,6          ;TIME OUT STATUS

002174  004567  000536          7.0   ANYDC:  JSR     %5,MAPIT        ;MAP DC11'S
002200  000002                                FL.DC                   ;DC11 FLAG

002202  012702  001220          3.8   ANYKL:  MOV     #SY.KL, R2      ;RESET SYSMAP TABLE POINTER
002206  004567  000524          7.0           JSR     %5,MAPIT        ;MAP KL11'S
002212  000004                                FL.KL                   ;KL11 FLAG

002214  052767  100000  000546  6.4   ANYDP:  BIS     #BIT15,MIT5     ;CHANCE ADD TO SUB
002222  004567  000510          7.0           JSR     %5,MAPIT        ;MAP DP11'S
002226  000010                                FL.DP                   ;DP11 FLAG
002230  042767  100000  000532  7.0           BIC     #BIT15,MIT5     ;CHANCE SUB TO ADD

002236  012702  001226          3.8   ANYDMA: MOV     #SY.DMA,R2      ;RESET SYSMAP TABLE POINTER
002242  004567  000470          7.0           JSR     %5,MAPIT        ;MAP DM11A'S
002246  000020                                FL.DMA                  ;DM11A FLAG

002250  004567  000462          7.0   ANYDN:  JSR     %5,MAPIT        ;MAP DN11'S
002254  000040                                FL.DN                   ;DN11 FLAG

002256  004567  000454          7.0   ANYDMB: JSR     %5,MAPIT        ;MAP DM11BB'S
002262  000100                                FL.DMB                  ;DM11BB FLAG

002264  004567  000446          7.0   ANYKG:  JSR     %5,MAPIT        ;MAP KG11'S
002270  000200                                FL.KG                   ;KG11 FLAG

002272  012702  001442          3.8   ANYDR:  MOV     #SY.DR1,R2      ;RESET SYSTEM MAP POINTER
002276  052767  100000  000464  6.4           BIS     #BIT15,MIT5     ;CHANCE ADD TO SUB
002304  004567  000426          7.0           JSR     %5,MAPIT        ;MAP DR11A'S AND DR11C'S
002310  000000                                0                       ;NO FLAG
002312  042767  100000  000450  7.0           BIC     #BIT15,MIT5     ;CHANCE SUB TO ADD

002320  006267  000446          4.9   ANYPAR: ASR     MIT5+2          ;CHANGE ADR INCREMENT TO 4
002324  004567  000406          7.0           JSR     %5,MAPIT        ;MAP PA611 READERS
002330  000000                                0                       ;NO FLAG
```

```
002332 004567 000400          7.0  ANYPAP: JSR    %5,MAPIT          ;MAP PA611 PUNCHES
002336 000000                                 0                        ;NO FLAG
002340 006267 000426          4.9  ANYDT:  ASR    MITS+2            ;CHANGE ADR INCREMENT TO 2
002344 004567 000366          7.0          JSR    %5,MAPIT          ;MAP DT11'S
002350 000000                                 0                        ;NO FLAG
002352 012702 001236          3.8  ANYDX:  MOV    #SY.DX, R2        ;RESET SYSTEM MAP POINTER
002356 012767 000040 000406   6.4          MOV    #40,    MITS+2    ;CHANGE ADR INCREMENT TO 40
002364 004567 000346          7.0          JSR    %5,MAPIT          ;MAP DX11'S
002370 000400                              .WORD  FL.DX             ;DX11 FLAG
002372 012767 000010 000372   6.4  ANYDLC: MOV    #10,    MITS+2    ;CHANGE ADR INCREMENT BACK TO 10
002400 004567 000332          7.0          JSR    %5,MAPIT          ;MAP DL11C,D,E'S
002404 001000                              FL.DLC                   ;DL11 FLAG
002406 012702 001244          3.8  ANYDJ:  MOV    #SY.DJ, R2        ;RESET SYSTEMS MAP POINTER
002412 004567 000320          7.0          JSR    %5,MAPIT          ;MAP DJ11'S
002416 004000                              FL.DJ                    ;DJ11 FLAG

                                   ;ANCIL, CODE TO DETERMINE IF RF, TC, LP EXIST

002420 012767 003034 175356   6.4  ANCIL:  MOV    #ANEXT,4          ;SET UP TIME OUT POINTER
002426 012767 002466 000404   6.4          MOV    #ANC1,  NT2       ;TIME OUT TRAPS TO NEXT TST
002434 005777 020352          5.6          TST    @CTKS             ;DOES CTY EXIST
002440 052767 000001 176544   6.4          BIS    #BIT0,  SY.ANC    ;YES, SET CTY BIT
                                   ;***** NO SACK TIMEOUT TEST ***********

002446 105777 020344          5.6  NOSAC:  TSTB   @CTPS             ;IS PUNCH READY
002452 100375                 2.6          BPL    NOSAC             ;WAIT FOR READY
002454 052777 000100 020334   7.6          BIS    #100,@CTPS        ;SET INTERRUPT ENABLE
002462 005077 020330          6.1          CLR    @CTPS             ;CLEAR INTERRUPT ENABLE
                                   ;PROCESSOR WILL HANG HERE IF NO-SACK-TIMEOUT FAILS
                                   ;*****************************
002466 012767 002506 000344   6.4  ANC1:   MOV    #ANC2,  NT2       ;TIME OUT TO NEXT DEVICE
002474 005777 020326          5.6          TST    @LP11             ;DOES LINE PRINTER EXIST
002500 052767 000002 176504   6.4          BIS    #BIT1,  SY.ANC    ;YES, SET LP11 BIT
002506 012767 002526 000324   6.4  ANC2:   MOV    #ANC3,  NT2       ;TIME OUT TO NEXT DEVICE
002514 005777 020302          5.6          TST    @TC11             ;DOES DECTAPE EXIST
002520 052767 000004 176464   6.4          BIS    #BIT2,  SY.ANC    ;SET TC11 BIT
002526 012767 002546 000304   6.4  ANC3:   MOV    #ANC4,  NT2       ;TIME OUT TO NEXT DEVICE
002534 005777 020264          5.6          TST    @RF11             ;DOES RF11 DISK EXIST
002540 052767 000010 176444   6.4          BIS    #BIT3,  SY.ANC    ;YES, SET RF11 BIT
002546 012767 002566 000264   6.4  ANC4:   MOV    #ANC5,  NT2       ;TIME OUT TO NEXT DEVICE
002554 005777 017570          5.6          TST    @RKCSR            ;TEST FOR RK11 DISK
002560 052767 000020 176424   6.4          BIS    #BIT4,  SY.ANC    ;SET RK FLAG
002566 012767 002606 000244   6.4  ANC5:   MOV    #ANC6,  NT2       ;TIMEOUT TO NEXT DEVICE
002574 005777 017732          5.6          TST    @RPCSR            ;DOES RP EXIST
002600 052767 000040 176404   6.4          BIS    #BIT5,  SY.ANC    ;YES SET RP BIT
002606 012767 000006 175170   6.4  ANC6:   MOV    #6,4              ;REINSTATE TRAP TO HALT
002614 012767 000000 175164   6.4          MOV    #HALT,6           ;
002622 005737 000042          3.2          TST    @#42              ;CHECK FOR A MONITOR
002626 001417                 2.6          BEQ    SYSMD             ;BRANCH IF NONE
002630 012701 001210          3.8          MOV    #SY.MAP,R1        ;GET SYSTEM MAP ADR
```

```
 865  002634  012702  001246            3.8          MOV     #SW.MAP,R2      ;GET SWITCH SETTING MAP ADR
 866  002640  012703  000017            3.8          MOV     #MAPSIZ,R3      ;GET MAP SIZE
 867  002644  012122                    5.2  SY.SW:  MOV     (R1)+, (R2)+    ;MOVE SY.MAP INTO SW.MAP
 868  002646  005303                    2.3          DEC     R3              ;CHECK FOR END
 869  002650  003375                    2.6          BGT     SY.SW           ;BRANCH IF NOT DONE
 870  002652  062716  000004            5.2          ADD     #4,       6)    ;SKIP "JSR PC,SWITCH"
 871  002656  005767  000052            4.4          TST     RPTFLG          ;TEST CONFIGURATION REPORT FLAG
 872  002662  001401                    2.6          BEQ     SYSM0           ; FIRST PASS BRANCHES
 873  002664  000207                    3.5          RTS     PC
 874
 875  002666  005767  176320            4.4  SYSM0:  TST     SY.ANC          ;CHECK FOR ANY ANCILLARIES
 876  002672  001403                    2.6          BEQ     1$              ;BRANCH IF NONE
 877  002674  052767  000001  176306    6.4          BIS     #BIT0,  SY.MAP  ;SET ANCIL BIT OF SYSTEM MAP
 878  002702  032737  020000  177570    5.3  1$:     BIT     #BIT13, @#SWR   ;CHECK INHIBIT CONFIGURATION REPORT
 879  002710  001010                    2.6          BNE     SYSM1           ;BRANCH IF SET
 880  002712  000004  027714                         TYPE,   MSG1            ;TYPE "SYSTEM CONFIGURATION"
 881  002716  012701  001212            3.8          MOV     #SY.ANC,R1      ;POINT TO SYSTEM MAP
 882  002722  010167  000006            4.9          MOV     R1,     RPTFLG  ;SET PASS CONTROL FLAG
 883  002726  004767  020140            7.0          JSR     PC,     REPORT  ;REPORT CONFIGURATION
 884  002732  000207                    3.5  SYSM1:  RTS     PC              ;RETURN TO MAIN LINE
 885
 886  002734  000000                        RPTFLG: 0                       ;CONFIGURATION REPORT CONTROL FLAG
 887
 888
 889                                          ;MAPIT, THIS SUBROUTINE PLACES A FLAG IN THE MAP OF EACH DEVICE TYPE.
 890                                          ;       EACH BIT IN THE DEVICE MAP INDICATES A UNIT.  FOR EXAMPLE,
 891                                          ;       A LOGIC ONE IN BIT LOCATIONS ZERO AND ONE OF THE DP11 MAP
 892                                          ;       INDICATES TWO DP11'S EXIST.
 893
 894  002736  012001                    3.8  MAPIT:  MOV     (R0)+,  R1      ;FETCH DEVICE ADDRESS
 895  002740  012467  020020            6.4          MOV     (R4)+,  MAX     ;FETCH MAX NUMBER OF DEVICE
 896  002744  005067  020074            4.9          CLR     DEVCNT          ;CLEAR DEVICE COUNT
 897  002750  012767  000001  020010    6.4  MIT1:   MOV     #1,     MARK    ;INC "DEVICE EXISTS" MARKER
 898  002756  005711                    3.2  MIT2:   TST     @R1             ;TIME OUT TO NEXT DEVICE IF NON EXISTANT
 899
 900                                          ;NOTE:  IF FIRST DEVICE DOES NOT EXIST THIS
 901                                          ;       ROUTINE WILL STOP LOOKING FOR ANY MORE
 902
 903  002760  051567  176224            6.4          BIS     (R5),   SY.MAP  ;SET BIT IN MAIN MAP
 904  002764  005267  020054            4.9          INC     DEVCNT          ;INC DEVICE COUNT
 905  002770  062701  000010            3.8  MIT5:   ADD     #10,R1          ;INC TO NEXT ADRS
 906  002774  056712  017766            6.4          BIS     MARK,@R2        ;SET MAP BIT
 907  003000  005367  017760            4.9          DEC     MAX             ;HAS THE MAX # BEEN TESTED
 908  003004  001406                    2.6          BEQ     MIT4            ;YES
 909  003006  006167  017754            4.9          ROL     MARK            ;NO, SHIFT MARKER
 910  003012  103361                    2.6          BCC     MIT2            ;MAP WORD FULL
 911  003014  005722                    3.2          TST     (R2)+           ;INC TO NEXT MAP
 912  003016  000754                    2.6          BR      MIT1
 913
 914                                          ;NEXT,TIME OUT ROUTINE TO ADJUST STACK AND JUMP TO
 915                                          ;NEXT DEVICE TEST
 916
 917  003020  022626                    4.7  NEXT:   CMP     (SP)+,(SP)+     ;ADJUST STACK
 918  003022  005722                    3.2  MIT4:   TST     (R2)+           ;UPDATE SYSTEM MAP POINTER
 919  003024  016723  020014            6.4          MOV     DEVCNT, (R3)+   ;SAVE DEVICE COUNT
 920  003030  005725                    3 2          TST     (R5)+           ;INC RETURN ADR.
```

```
 921  0C3032  000205                    3.5          RTS     %5              ;RETURN
 922
 923                                                 ;TIMEOUT TRAP FOR ANCILLARIES
 924  003034  022626                    4.7  ANEXT:  CMP     (SP)+,(SP +     ;ADJUST STACK
 925  003036  000137                    3.7  NT1:    JMP     @(PC)+          ;TEST NEXT DEVICE
 926  003040  000000                         NT2:    0
 927
 928                                         ;********************** SYSMAP ****************************************
```

```
                                        ;****************************** SWITCH ************************************

                                        ;SWITCH ROUTINE TO SAVE CONSOL SWITCH SETTING
                                        ;THESE SWITCH SETTINGS DETERMINE WHICH DEVICES ARE TO BE TESTED

003042  004567  020000          7.0   SWITCH: JSR     R5,     CLEAR   ;CLEAR TABLE SUBROUTINE
003046  001246                          SW.MAP                          ;START HERE
003050  000017                          MAPSIZ                          ;THIS MANY WORDS
003052  005067  003366          4.9           CLR     DX.OLF          ;RESET DX ACTIVITY

003056  005737  000042          3.2           TST     @#42            ;CHECK ACT11 MONITOR
003062  001412                  2.6           BEQ     1$              ;NO BYPASS

003064  012700  000017          3.8           MOV     #MAPSIZ,R0      ;SCHEDULE
003070  012701  001210          3.8           MOV     #SY.MAP,R1      ;ALL
003074  012702  001246          3.8           MOV     #SW.MAP,R2      ;DEVICES
003100  012122                  5.2   2$:     MOV     (R1)+,(R2)+     ;ON SYSTEM
003102  005300                  2.3           DEC     R0              ;FOR
003104  001375                  2.6           BNE     2$              ;TEST
003106  000207                  3.5           RTS     PC              ;RETURN TO MAINLINE

003110  012700  000001          3.8   1$:     MOV     #1,     R0      ;SET R0 TO DISPLAY SETTING 1
003114  000000                  1.8   HLT01:  HALT                    ;SELECT DEVICES
                                                                      ;PRESS CONTINUE
003116  016767  174446  176122  7.6           MOV     SWR,    SW.MAP  ;SAVE SWITCH REG
003124  032767  000001  176114  6.5           BIT     #BIT0,  SW.MAP  ;CHECK FOR NON-COMM DEVICES
003132  001406                  2.6           BEQ     STCH0           ;BRANCH IF NONE
003134  012700  000002          3.8           MOV     #2,     R0      ;DISPLAY SETTING #2
003140  000000                  1.8   HLT02:  HALT                    ;SELECT NON-COMM TEST CONFIGURATION
                                                                      ;PRESS CONTINUE
003142  016767  174422  176100  7.6           MOV     SWR,    SW.ANC  ;SAVE SWITCH REG
003150  032767  000002  176070  6.5   STCH0:  BIT     #BIT1,  SW.MAP  ;CHECK FOR ANY DC11'S
003156  001417                  2.6           BEQ     STCH1           ;BRANCH IF NONE
003160  012700  000003          3.8           MOV     #3,     R0      ;DISPLAY SETTING #3
003164  000000                  1.8   HLT03:  HALT                    ;FIRST DC11 SETTING
                                                                      ;PRESS CONTINUE
003166  016767  174376  176056  7.6           MOV     SWR,    SW.DC1  ;SAVE SWITCH REG
003174  005767  176016          4.4           TST     SY.DC2          ;ARE THERE DC11 LINES 16-31
003200  001406                  2.6           BEQ     STCH1           ;BRANCH IF NOT
003202  012700  000004          3.8           MOV     #4,     R0      ;DISPLAY SETTING #4
003206  000000                  1.8   HLT04:  HALT                    ;SECOND DC11 SETTING
                                                                      ;PRESS CONTINUE
003210  016767  174354  176036  7.6           MOV     SWR,    SW.DC2  ;SAVE SETTINGS
003216  032767  000004  176022  6.5   STCH1:  BIT     #BIT2,  SW.MAP  ;NEW KL11 SETTINGS
003224  001406                  2.6           BEQ     STCH2           ;NO
003226  012700  000005          3.8           MOV     #5,     R0      ;YES, DISPLAY SETTING 5=TTY
003232  000000                  1.8   HLT05:  HALT                    ;SET SWR TO TEST PATTERS
                                                                      ;PRESS CONTINUE
003234  016767  174330  176014  7.6           MOV     SWR,    SW.KL   ;SAVE SETTINGS
003242  032767  000010  175776  6.5   STCH2:  BIT     #BIT3,  SW.MAP  ;NEW DP11 TEST CONFIGURATION
003250  001417                  2.6           BEQ     STCH3           ;NO
003252  012700  000006          3.8           MOV     #6,     R0      ;DISPLAY SETTING 6=DP11
003256  000000                  1.8   HLT06:  HALT                    ;SELECT DP11 TEST CONFIGURATION
                                                                      ;PRESS CONTINUE
003260  016767  174304  175772  7.6           MOV     SWR,    SW.DP1  ;SAVE DP LINES 0-15
```

```
  995  003266  005767  175732          4.4          TST     SY.DP2          ;ARE THERE DP11 LINES 16-31
  996  003272  001406                  2.6          BEQ     STCH3           ;BRANCH IF NOT
  997  003274  012700  000007          3.8          MOV     #7,     R0      ;DISPLAY SETTING 7
  998  003300  000000                  1.8  HLT07:  HALT                    ;SELECT DP LINES 16-31
  999                                                                       ;PRESS CONTINUE
  990  003302  016767  174262  175752  7.6          MOV     SWR,    SW.DP2  ;SAVE SETTINGS
  991  003310  032767  000020  175730  6.5  STCH3:  BIT     #BIT4,  SW.MAP  ;NEW DM11 TEST CONFIGURATION
  992  003316  001406                  2.6          BEQ     STCH4
  993  003320  012700  000010          3.8          MOV     #10,    R0      ;DISPLAY SETTING #10
  994  003324  000000                  1.8  HLT10:  HALT                    ;SELECT DM11'S
  995                                                                       ;PRESS CONTINUE
  996  003326  016767  174236  175730  7.6          MOV     SWR,    SW.DMA  ;SAVE SETTINGS
  997  003334  032767  000040  175704  6.5  STCH4:  BIT     #BIT5,  SW.MAP  ;NEW DM11 TEST CONFIGURATION
  998  003342  001406                  2.6          BEQ     STCH5
  999  003344  012700  000011          3.8          MOV     #11,    R0      ;DISPLAY SETTING #11
 1000  003350  000000                  1.8  HLT11:  HALT                    ;SELECT DM11'S
 1001                                                                       ;PRESS CONTINUE
 1002  003352  016767  174212  175706  7.6          MOV     SWR,    SW.DN   ;SAVE SETTINGS
 1003  003360  032767  000100  175660  6.5  STCH5:  BIT     #BIT6,  SW.MAP  ;CHECK FOR DM11BB'S
 1004  003366  001406                  2.6          BEQ     STCH6           ;BRANCH IF NONE
 1005  003370  012700  000012          3.8          MOV     #12,    R0      ;DISPLAY SETTING #12
 1006  003374  000000                  1.8  HLT12:  HALT                    ;SELECT DM11BB'S
 1007                                                                       ;PRESS CONTINUE
 1008  003376  016767  174166  175664  7.6          MOV     SWR,    SW.DMB  ;SAVE SETTINGS
 1009  003404  032767  000200  175634  6.5  STCH6:  BIT     #BIT7,  SW.MAP  ;CHECK FOR KG11'S
 1010  003412  001406                  2.6          BEQ     STCH7           ;BRANCH IF NONE
 1011  003414  012700  000013          3.8          MOV     #13,    R0      ;DISPLAY SETTING #13
 1012  003420  000000                  1.8  HLT13:  HALT                    ;SELECT KG11'S
 1013                                                                       ;PRESS CONTINUE
 1014  003422  016767  174142  175642  7.6          MOV     SWR,    SW.KG   ;SAVE SETTINGS
 1015  003430  032767  000400  175610  6.5  STCH7:  BIT     #BIT8,  SW.MAP  ;CHECK FOR DX11'S
 1016  003436  001436                  2.6          BEQ     STCH8           ;BRANCH IF NONE
 1017  003440  012700  000014          3.8          MOV     #14,    R0      ;DISPLAY SETTING #14
 1018  003444  000000                  1.8  HLT14:  HALT                    ;SELECT DX11'S
 1019                                                                       ;PRESS CONTINUE
 1020  003446  113767  177570  175620  6.4          MOVB    @#SWR,  SW.DX   ;SAVE SETTINGS
 1021  003454  113737  177571  006444  5.2          MOVB    @#SWR+1,@#DX.OLF ;SAVE ON-LINE SELECTION
 1022  003462  053767  006444  175604  6.4          BIS     @#DX.OLF,SW.DX  ;MAKE SURE DX SELECTED FOR ON-LINE SELECTED.
 1023  003470  012701  000001          3.8          MOV     #1,     R1      ;SET UP MARKER
 1024  003474  012700  177400          3.8          MOV     #177400,R0      ;SET UP DATA LIGHTS
 1025  003500  012702  017430          3.8          MOV     #DXLEGA,R2      ;ADDRESS POINTER IN R2
 1026  003504  030137  001274          3.8  STCH70: BIT     R1,     @#SW.DX ;CHECK FOR DX11 SELECTED
 1027  003510  001403                  2.6          BEQ     STCH80          ;BRANCH IF NOT
 1028  003512  000000                  1.8  HLT70:  HALT                    ;SELECT DX11 LEGAL ADDRESS
 1029                                                                       ;PRESS CONTINUE
 1030  003514  013712  177570          5.2          MOV     @#SWR,  (R2)    ;SAVE IT
 1031  003520  005722                  3.2  STCH80: TST     (R2)+           ;UPDATE POINTER
 1032  003522  006301                  2.3          ASL     R1              ;UPDATE MARKER
 1033  003524  005200                  2.3          INC     R0              ;UPDATE DATA LIGHTS
 1034  003526  120067  176002          4.4          CMPB    R0,     NO.DX   ;CHECK FOR ALL DONE
 1035  003532  001364                  2.6          BNE     STCH70          ;BRANCH IF NOT
 1036  003534  032767  001000  175504  6.5  STCH8:  BIT     #BIT9,  SW.MAP  ;CHECK FOR DL11C,D,E'S
 1037  003542  001420                  2.6          BEQ     STCH9           ;BRANCH IF NONE
 1038  003544  012700  000015          3.8          MOV     #15,    R0      ;DISPLAY SETTING #15
 1039  003550  000000                  1.8  HLT15:  HALT                    ;SELECT DL11C,D,E'S
 1040                                                                       ;PRESS CONTINUE
```

```
1041  003552  016767  174012  175516    7.6           MOV     SWR,     SW.DL1  ;SAVE SETTINGS
1042  003560  005767  175456            4.4           TST     SY.DL2           ;ARE THERE DL11 LINES 16-3
1043  003564  001407                    2.6           BEQ     STCH9            ;BRANCH IF NOT
1044  003566  012700  000016            3.8           MOV     #16,     R0      ;DISPLAY SETTING #16
1045  003572  000000                    1.8   HLT16:  HALT                     ;SELECT DL11C,D,E'S
1046                                                                           ;PRESS CONTINUE
1047  003574  016767  173770  175476    7.6           MOV     SWR,     SW.DL2  ;SAVE SETTINGS
1048
1049  003602  000400                    2.6           BR      STCH9            ;*********
1050
1051  003604  032767  004000  175434    6.5   STCH9:  BIT     #BIT11,  SW.MAP  ;CHECK FOR DJ11'S
1052  003612  001526                    2.6           BEQ     STCH30           ;BRANCH IF NONE
1053
1054  003614  012700  000200            3.8           MOV     #200,    R0      ;DISPLAY SETTING #200
1055  003620  000000                    1.8   HLT200: HALT                     ;SELECT DJ11 DEVICE #0-#7
1056  003622  016767  173742  175452    7.6           MOV     SWR,     SW.DJ   ;RECORD SETTING
1057
1058
1059  003630  032767  000001  175444    6.5           BIT     #BIT0,   SW.DJ   ;DJ11 DEVICE #0 TO BE TESTED?
1060  003636  001406                    2.6           BEQ     STCH10           ;BRANCH IF NOT
1061
1062  003640  012700  000020            3.8           MOV     #20,     R0      ;DISPLAY SETTING #20
1063  003644  000000                    1.8   HLT20:  HALT                     ;SELECT DJ11 DEVICE #0 LINES 0 THRU 15 FOR TEST
1064
1065  003646  016767  173716  175602    7.6           MOV     SWR,     SW.DJ0  ;SAVE SETTING
1066
1067
1068  003654  032767  000002  175420    6.5   STCH10: BIT     #BIT1,   SW.DJ   ;DJ11 DEVICE #1 TO BE TESTED?
1069  003662  001406                    2.6           BEQ     STCH11           ;BRANCH IF NOT
1070
1071  003664  012700  000021            3.8           MOV     #21,     R0      ;DISPLAY SETTING #21
1072  003670  000000                    1.8   HLT21:  HALT,                    ;SELECT DJ11 DEVICE #1 LINES 0 THRU 15 FOR TEST
1073
1074  003672  016767  173672  175560    7.6           MOV     SWR,     SW.DJ1  ;SAVE SETTING
1075
1076
1077  003700  032767  000004  175374    6.5   STCH11: BIT     #BIT2,   SW.DJ   ;DJ11 DEVICE #2 TO BE TESTED?
1078  003706  001406                    2.6           BEQ     STCH12           ;BRANCH IF NOT
1079  003710  012700  000022            3.8           MOV     #22,     R0      ;DISPLAY SETTING #22
1080  003714  000000                    1.8   HLT22:  HALT                     ;SELECT DJ11 DEVICE #2 LINES 0 THRU 15 FOR TEST
1081
1082  003716  016767  173646  175536    7.6           MOV     SWR,     SW.DJ2  ;SAVE SETTING
1083
1084
1085
1086  003724  032767  000010  175350    6.5   STCH12: BIT     #BIT3,   SW.DJ   ;DJ11 DEVICE #3 TO BE TESTED?
1087  003732  001406                    2.6           BEQ     STCH13           ;BRANCH IF NOT
1088
1089  003734  012700  000023            3.8           MOV     #23,     R0      ;DISPLAY SETTING #23
1090  003740  000000                    1.8   HLT23:  HALT                     ;SELECT DJ11 DEVICE #3 LINES 0 THRU 15 FOR TEST
1091
1092  003742  016767  173622  175514    7.6           MOV     SWR,     SW.DJ3  ;SAVE SETTING
1093
1094
1095
1096  003750  032767  000020  175324    6.5   STCH13: BIT     #BIT4,   SW.DJ   ;DJ11 DEVICE #4 TO BE TESTED?
```

```
1097  003756  001406                    2.6          BEQ     STCH14          ;BRANCH IF NOT
1098
1099  003760  012700  000024            3.8          MOV     #24,    R0      ;DISPLAY SETTING #24
1100  003764  000000                    1.8  HLT24:  HALT                    ;SELECT DJ11 DEVICE #4 LINES 0 THRU 15 FOR TEST
1101
1102  003766  016767  173576  175472    7.6          MOV     SWR,    SW.DJ4  ;SAVE SETTING
1103
1104
1105
1106  003774  032767  000040  175300    6.5  STCH14: BIT     #BIT5,  SW.DJ   ;DJ11 DEVICE #5 TO BE TESTED?
1107  004002  001406                    2.6          BEQ     STCH15          ;BRANCH IF NOT
1108
1109  004004  012700  000025            3.8          MOV     #25,    R0      ;DISPLAY SETTING #25
1110  004010  000000                    1.8  HLT25:  HALT                    ;SELECT DJ11 DEVICE #5 LINES 0 THRU 15 FOR TEST
1111
1112  004012  016767  173552  175450    7.6          MOV     SWR,    SW.DJ5  ;SAVE SETTING
1113
1114
1115
1116  004020  032767  000100  175254    6.5  STCH15: BIT     #BIT6,  SW.DJ   ;DJ11 DEVICE #6 TO BE TESTED?
1117  004026  001406                    2.6          BEQ     STCH16          ;BRANCH IF NOT
1118
1119  004030  012700  000026            3.8          MOV     #26,    R0      ;DISPLAY SETTING #26
1120  004034  000000                    1.8  HLT26:  HALT                    ;SELECT DJ11 DEVICE #6 LINES 0 THRU 15 FOR TEST
1121
1122  004036  016767  173526  175426    7.6          MOV     SWR,    SW.DJ6  ;SAVE SETTING
1123
1124
1125
1126  004044  032767  000200  175230    6.5  STCH16: BIT     #BIT7,  SW.DJ   ;DJ11 DEVICE #7 TO BE TESTED?
1127  004052  001406                    2.6          BEQ     STCH30          ;BRANCH IF NOT
1128
1129  004054  012700  000027            3.8          MOV     #27,    R0      ;DISPLAY SETTING #27
1130  004060  000000                    1.8  HLT27:  HALT                    ;SELECT DJ11 DEVICE #7 LINES 0 THRU 15 FOR TEST
1131
1132  004062  016767  173502  175404    7.6          MOV     SWR,    SW.DJ7  ;SAVE SETTING
1133  004070  012701  001210            3.8  STCH30: MOV     #SY.MAP,R1      ;GET SYSTEM MAP ADR
1134  004074  012702  001246            3.8          MOV     #SW.MAP,R2      ;GET SWITCH SETTING MAP ADR
1135
1136  004100  012703  000017            3.8          MOV     #MAPSIZ,R3      ;GET MAP SIZE
1137  004104  005111                    3.7  SWCHK:  COM     (R1)
1138  004106  031122                    5.3          BIT     (R1),   (R2)+   ;CHECK IF SELECTED DEV. EXIST
1139  004110  001425                    2.6          BEQ     SWCHK2          ;BRANCH IF THEY DO
1140  004112  005121                    3.7          COM     (R1)+           ;RESTORE SY.MAP
1141  004114  000004  004120                         TYPE,   .+2
1142  004120  005015  042523  042514                .ASCIZ  <15><12>"SELECTED NON-EXISTANT DEVICE"
1143  004126  052103  042105  047040
1144  004134  047117  042455  044530
1145  004142  052123  047101  020124
1146  004150  042504  044526  042503
1147  004156     000
1148          004160                         .EVEN
1149  004160  000167  176656            4.9          JMP     SWITCH          ;TRY AGAIN!
1150
1151  004164  005121                    3.7  SWCHK2: COM     (R1)+           ;RESTORE SY.MAP AND INCREMENT
1152  004166  005303                    2.3          DEC     R3              ;CHECK FOR END OF MAPS
```

```
1153  004170  003345                2.6          BGT     SWCHK           ;BRANCH IF NOT DONE
1154  004172  012700  177777        3.8          MOV     #-1.    R0      ;DISPLAY SETTING #-1
1155  004176  000000                1.8  HLT77:  HALT                    ;SELECT DYNAMIC SWITCH SETTINGS
1156
1157  004200  005000                2.3          CLR     R0
1158  004202  000207                3.5          RTS     PC              ;RETURN TO MAIN LINE
```

```
                                        ;****************************** SYSGEN ********************************
                                        ;SYSGEN,THE FUNCTION OF THIS ROUTINE IS TO LINK DEVICE VECTORS WITH
                                        ;       THEIR APPROPRIATE INTERRUPT SERVICE ROUTINE (ISR).  AND REPOR
                                        ;       THE ERRONEOUS SELECTION OF NONEXISTANT DEVICES.
                                        ;****************************** SYSGEN ********************************
004204  016700  175462          5.0   SYSGEN: MOV     FIRSTV, R0      ;LOAD R0 WITH FIRST COMM VECTOR
004210  012701  031424          3.8           MOV     #LINKER,R1      ;LOAD R1 WITH ADRS OF LINKER AREA
004214  012702  001634          3.8           MOV     #BR.DC, R2      ;SET UP BR TABLE POINTER
004220  012703  001506          3.8           MOV     #NO.DC, R3      ;SET UP DEVICE COUNT TABLE POINTER
004224  012704  001252          3.8           MOV     #SW.DC1,R4      ;SET UP DEVICE SELECTED MAP POINTER
                                        ;LINK DC'S WITH THEIR ISR
004230  004537  004572          5.8           JSR     %5,@#LINK       ;GENERATE CODE TO LINK DC'S WITH ISR
004234  012776                                DC.RCV                  ;RCV ISR ADRS
004236  012730                                DC.XMT                  ;XMIT ISR ADRS
                                        ;LINK KL VECTORS WITH THEIR ISR'S
004240  012704  001256          3.8           MOV     #SW.KL,R4
004244  004537  004572          5.8           JSR     %5,@#LINK       ;LINK KL'S WITH ISR'S
004250  013302                                KL.RCV                  ;RCV ISR ADRS
004252  013204                                KL.XMT                  ;XMIT ISR ADRS
                                        ;LINK DP'S WITH ISR'S
004254  004537  004572          5.8           JSR     %5,@#LINK       ;LINK DP'S WITH ISR'S
004260  013532                                DP.RCV                  ;RCV ISR ADRS
004262  013704                                DP.XMT                  ;XMIT ISR ADRS
                                        ;LINK DM'S WITH ISR'S
004264  012704  001264          3.8           MOV     #SW.DMA,R4
004270  004537  004572          5.8           JSR     %5,@#LINK       ;LINK DM'S WITH ISR'S
004274  014342                                DM.RCV                  ;RCV ISR ADRS
004276  014222                                DM.XMT                  ;XMIT ISR ADRS
                                        ;LINK DN'S WITH ISR'S
004300  004537  004676          5.8           JSR     %5,@#LINK1      ;LINK DN'S WITH ISR
004304  015054                                DN.ISR                  ;ISR ADR
                                        ;LINK DM11BB'S WITH ISR
004306  004537  004676          5.8           JSR     %5,@#LINK1
004312  015370                                .WORD   DMBISR
004314  005723                  3.2           TST     (R3)+           ;SKIP KG DEVICE COUNT
004316  005724                  3.2           TST     (R4)+           ;SKIP KG SWITCH MAP
004320  004567  000452          7.0           JSR     %5,SKIPVA       ;DR11
004324  000010                                .WORD   10
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1215  004326  004567  000444          7.0          JSR     %5,SKIPVA       ;PA611 R
1216  004332  000004                               .WORD   4
1217  004334  004567  000436          7.0          JSR     %5,SKIPVA       ;PA611 P
1218  004340  000004                               .WORD   4
1219  004342  004567  000430          7.0          JSR     %5,SKIPVA       ;DT11
1220  004346  000010                               .WORD   10
1221
1222                                         ;LINK DX11'S WITH ISR
1223
1224  004350  004767  000450          7.0          JSR     PC,     MOD10   ;MAKE SURE VECTOR ADR POINTER IS ON MOD10
1225  004354  004537  004572          5.8          JSR     %5,@#LINK
1226  004360  015442                               .WORD   DX.ISR          ;DEFAULT TO OFF LINE
1227  004362  015436                               .WORD   DMY.ISR
1228  004364  005767  002054          4.4          TST     DX.OLF          ;CHECK FOR ANY DX ON-LINE FLAGS
1229  004370  001451                   2.6          BEQ     6$              ;BRANCH IF NONE
1230  004372  012767  000001  016366  6.4          MOV     #1,     MARK    ;SET UP MARKER
1231  004400  016767  175130  016356  7.6          MOV     NO.DX,  MAX     ;SET UP MAX COUNTER
1232  004406  036767  016354  174660  7.7  1$:     BIT     MARK,   SW.DX   ;CHECK FOR DX SELECTED
1233  004414  001402                   2.6          BEQ     2$              ;BRANCH IF NOT
1234  004416  162701  000014          3.8          SUB     #14,    R1      ;DECREMENT LINKER POINTER
1235  004422  006367  016340          4.9  2$:     ASL     MARK            ;UPDATE MARKER
1236  004426  005367  016332          4.9          DEC     MAX             ;CHECK FOR DONE
1237  004432  001365                   2.6          BNE     1$              ;BRANCH IF NOT
1238  004434  012767  000001  016324  6.4          MOV     #1,     MARK    ;SET UP MARKER
1239  004442  016767  175066  016314  7.6          MOV     NO.DX,  MAX     ;SET UP COUNTER
1240  004450  036767  016312  174616  7.7  3$:     BIT     MARK,   SW.DX   ;CHECK FOR DX SELECTED
1241  004456  001411                   2.6          BEQ     5$              ;BRANCH IF NOT
1242  004460  036767  016302  001756  7.7          BIT     MARK,   DX.OLF  ;CHECK FOR ON-LINE
1243  004466  001403                   2.6          BEQ     4$              ;BRANCH IF NOT
1244  004470  012761  015636  000002  6.4          MOV     #DXOL.ISR,2(R1) ;CHANGE THE ISR ADDRESS TO ON LINE
1245  004476  062701  000014          3.8  4$:     ADD     #14,    R1      ;RESTORE R1
1246  004502  006367  016260          4.9  5$:     ASL     MARK            ;UPDATE MARKER
1247  004506  005367  016252          4.9          DEC     MAX             ;CHECK FOR DONE
1248  004512  001356                   2.6          BNE     3$              ;BRANCH IF NOT
1249
1250                                         ;LINK DL11C,D,E WITH THEIR ISR'S
1251
1252  004514  004767  000304          7.0  6$:     JSR     PC,     MOD10   ;MAKE SURE VECTOR ADR POINTER IS ON MOD10
1253  004520  004537  004572          5.8          JSR     %5,     @#LINK  ;LINK DL'S WITH ISR'S
1254  004524  017742                               .WORD   DL.RCV          ;RECEIVER ISR ADR
1255  004526  017652                               .WORD   DL.XMT          ;TRANSMITTER ISR ADR
1256
1257                                         ;LINK DJ11'S WITH THEIR ISR'S
1258
1259
1260  004530  004767  000270          7.0          JSR     PC,     MOD10   ;MAKE SURE VECTOR ADR POINTER IS ON MOD10
1261  004534  012704  001302          3.8          MOV     #SW.DJ,R4       ;DEVICE SELECTED MAP POINTER MOD10
1262  004540  004537  004572          5.8          JSR     %5,     @#LINK  ;LINK DJ'S WITH ISR'S
1263  004544  020344                               .WORD   DJ.RCV          ;RECEIVER ISR ADR
1264  004546  020224                               .WORD   DJ.XMT          ;TRANSMITTER ISR ADR
1265                                         ;*****************************
1266                                         ;       MOV     #SW.NEXT,R4
1267                                         ;       JSR     PC,     @#LINK
1268                                         ;*****************************
1269
1270  004550  004767  000250          7.0          JSR     PC,     MOD10   ;MAKE SURE VECTOR ADD POINTER IS ON MOD10
```

```
1271
1272  004554  010067  174716          4.9          MOV     R0,ENDVEC       ;STORE END OF VECTOR AREA
1273  004560  010037  001026          3.7  FVECTX: MOV     R0,@#FVECT      ;SET NXT AVAILABLE FLOATING VECTOR ADDRESS GLOBA
1274  004564  010167  174710          4.9          MOV     R1,ENDLNK       ;STORE END OF LINKER AREA
1275  004570  000207                  3.5          RTS     PC              ;RETURN TO MAIN LINE
1276
1277
1278                                               ;LINK, ROUTINES TO LINK DEVICE VECTORS WITH THEIR ISR'S
1279
1280  004572  005067  016172          4.9  LINK:   CLR     LINE            ;SET LINE EQUAL TO ZERO
1281  004576  012567  000304          6.4          MOV     (R5)+,  RCVISR  ;FETCH ADRS OF RCV ISR ADRS
1282  004602  012567  000302          6.4          MOV     (R5)+,  XMTISR  ;FETCH ADRS OF XMIT ISR ADRS
1283  004606  012267  000300          6.4          MOV     (R2)+,  PRTLVL  ;GET PRIORITY LEVEL
1284  004612  012367  016146          6.4          MOV     (R3)+,  MAX     ;FETCH NUMBER OF DEVICES ON THE SYSTEM
1285  004616  001465                  2.6          BEQ     LNK15           ;BRANCH IF NONE
1286  004620  012767  000001  016140  6.4  LNK1:   MOV     #1,MARK         ;SET UP LINE POINTER
1287  004626  036714  016134          6.5  LNK2:   BIT     MARK,   (R4)    ;WAS THIS LINE SELECTED
1288  004632  001003                  2.6          BNE     LNK3            ;YES
1289  004634  062700  000010          3.8          ADD     #10,R0          ;NO, INC TO NEXT VECTOR ADRS
1290  004640  000404                  2.6          BR      LNK4            ;CONTINUE
1291  004642  004767  000170          7.0  LNK3:   JSR     %7,CODRCV       ;LOAD LINKING CODE
1292  004646  004767  000210          7.0          JSR     %7,CODXMT
1293  004652  005267  016112          4.9  LNK4:   INC     LINE            ;INC TO NEXT LINE NUMBER
1294  004656  005367  016102          4.9          DEC     MAX             ;HAS MAXIMUM NUMBER BEEN CHECKED
1295  004662  003443                  2.6          BLE     LNK15           ;BRANCH TO EXIT IF FINISHED
1296  004664  006367  016076          4.9          ASL     MARK            ;SHIFT LINE POINTER
1297  004670  103356                  2.6          BCC     LNK2
1298  004672  005724                  3.2          TST     (R4)+           ;INC TO MAP 2
1299  004674  000751                  2.6          BR      LNK1            ;REINIT LINE POINTER
1300
1301  004676  005067  016066          4.9  LINK1:  CLR     LINE            ;SET LINE EQUAL TO ZERO
1302  004702  012567  000200          6.4          MOV     (R5)+,  RCVISR  ;FETCH ADRS OF RCV ISR ADRS
1303  004706  012267  000200          6.4          MOV     (R2)+,  PRTLVL  ;GET PRIORITY LEVEL
1304  004712  012367  016046          6.4          MOV     (R3)+,  MAX     ;FETCH NUMBER OF DEVICES ON THE SYSTEM
1305  004716  001425                  2.6          BEQ     LNK15           ;BRANCH IF NONE
1306  004720  012767  000001  016040  6.4  LNK11:  MOV     #1,MARK         ;SET UP LINE POINTER
1307  004726  036714  016034          6.5  LNK12:  BIT     MARK,   (R4)    ;WAS THIS LINE SELECTED
1308  004732  001003                  2.6          BNE     LNK13           ;YES
1309  004734  062700  000004          3.8          ADD     #4,R0           ;NO, INC TO NEXT VECTOR ADRS
1310  004740  000402                  2.6          BR      LNK14           ;CONTINUE
1311  004742  004767  000070          7.0  LNK13:  JSR     %7,CODRCV       ;LOAD LINKING CODE
1312  004746  005267  016016          4.9  LNK14:  INC     LINE            ;INC TO NEXT LINE NUMBER
1313  004752  005367  016006          4.9          DEC     MAX             ;HAS MAXIMUM NUMBER BEEN CHECKED
1314  004756  003405                  2.6          BLE     LNK15           ;BRANCH TO EXIT IF FINISHED
1315  004760  006367  016002          4.9          ASL     MARK            ;SHIFT LINE POINTER
1316  004764  103360                  2.6          BCC     LNK12
1317  004766  005724                  3.2          TST     (R4)+           ;INC TO MAP 2
1318  004770  000753                  2.6          BR      LNK11           ;REINIT LINE POINTER
1319  004772  005724                  3.2  LNK15:  TST     (R4)+
1320  004774  000205                  3.5          RTS     %5              ;RETURN
1321
1322  004776  004767  000022          7.0  SKIPVA: JSR     PC,     MOD10   ;MAKE SURE VECTOR ADR POINTER IS ON MOD10
1323  005002  012367  015756          6.4          MOV     (R3)+,MAX
1324  005006  005367  015752          4.9  SKIPV1: DEC     MAX
1325  005012  100402                  2.6          BMI     SKIPV2
1326  005014  061500                  3.8          ADD     (5),R0
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1327  005016  000773                2.6          BR      SKIPV1
1328  005020  005725                3.2  SKIPV2: TST     (R5)+
1329  005022  000205                3.5          RTS     R5
1330
1331                                    ;SUBROUTINE TO UPDATE VECTOR ADDRESS POINTER (R0) TO A MOD10(8) BOUNDARY
1332  005024  062700  000004        3.8  MOD10:  ADD     #4,     R0      ;INC BY 4
1333  005030  042700  000004        4.4          BIC     #4,     R0      ;MAKE MOD10(8)
1334  005034  000207                3.5          RTS     PC
1335
1336                                    ;CODE, ROUTINES TO FILL IN CODE FOR VECTOR AND LINKER AREA
1337
1338  005036  010120                3.7  CODRCV: MOV     R1,(R0)+        ;POINT RCV VECTOR TO LINKER
1339  005040  016720  000046        6.4          MOV     PRTLVL,(R0)+    ;SET UP DEVICE PRIORITY
1340  005044  012721  004537        5.2          MOV     #4537,(R1)+     ;LOAD LINKER WITH JSR
1341  005050  016721  000032        6.4          MOV     RCVISR, (R1)+   ;LOAD LINKER WITH DESTINATION
1342  005054  016721  015710        6.4          MOV     LINE,   (R1)+   ;LOAD LINKER WITH LINE #
1343  005060  000207                3.5          RTS     %7
1344
1345  005062  010120                3.7  CODXMT: MOV     R1,(R0)+        ;POINT XMT VECTOR TO LINKER
1346  005064  016720  000022        6.4          MOV     PRTLVL,(R0)+    ;SET UP DEVICE PRIORITY
1347  005070  012721  004537        5.2          MOV     #4537,(R1)+     ;LOAD LINKER WITH JSR
1348  005074  016721  000010        6.4          MOV     XMTISR, (R1)+   ;LOAD LINKER WITH DESTINATION
1349  005100  016721  015664        6.4          MOV     LINE,   (R1)+   ;LOAD LINKER WITH LINE #
1350  005104  000207                3.5          RTS     %7              ;RETURN
1351
1352  005106  000000                    RCVISR: 0                       ;TEMP RCV ISR ADR
1353  005110  000000                    XMTISR: 0                       ;TEMP XMT ISR ADR
1354  005112  000000                    PRTLVL: 0                       ;TEMP PRIORITY LEVEL
1355
1356                                    ;****************************** SYSGEN ******************************
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1357
1358                                        ;****************************** DEVICE ********************************
1359
1360                                        ;DEVICE, ROUTINE TO PRIME DEVICE CSR AND DATA
1361
1362                                        ;****************************** DEVICE ********************************
1363
1364                                        ;DETERMINE MEMORY SIZE
1365
1366  005114  000240                  1.5  DEVICE: NOP
1367  005116  012737  005140  000004  5.2          MOV     #XMISR, @#4     ;TRAP TO XMISR ON TIMEOUT
1368  005124  016700  174350          5.0          MOV     ENDLNK, R0      ;FETCH BEGINNING OF FREE MEMORY
1369  005130  010067  174346          4.9          MOV     R0,     ENDTAB  ;SET UP END OF TABLE POINTER
1370  005134  005720                  3.2          TST     (R0)+           ;TIMEOUT AT END OF MEMORY
1371  005136  000776                  2.6          BR      .-2                                      ;
1372
1373                                        ;ENTER HERE ON TIMEOUT
1374
1375  005140  022626                  4.7  XMISR:  CMP     (SP)+,  (SP)+   ;ADJUST STACK
1376  005142  012737  000006  000004  5.2          MOV     #6,     @#4     ;REINSTATE TIME OUT TRAP
1377  005150  162700  001000          3.8          SUB     #1000,  R0      ;SAVE ROOM TO BOOT.
1378  005154  005737  000042          3.2          TST     @#42            ;CHECK FOR MONITOR
1379  005160  001410                  2.6          BEQ     XMHOOK          ;BRANCH IF NONE
1380  005162  023767  000042  005310  5.9          CMP     @#42,PROEND
1381  005170  001404                  2.6          BEQ     XMHOOK
1382  005172  013700  000042          3.8          MOV     @#42,   R0      ;42 HAS TOP OF CORE
1383  005176  162700  000200          3.8          SUB     #200,   R0      ;SAVE ROOM FOR LAST CORE TEST
1384  005202  010067  174276          4.9  XMHOOK: MOV     R0,     ENDCOR  ;SAVE END OF USEABLE CORE
1385
1386                                        ;INITIALIZE DC11'S
1387
1388  005206  032767  000002  174032  6.5  DCINIT: BIT     #FL.DC,SW.MAP   ;CHECK FOR DC11'S
1389  005214  001433                  2.6          BEQ     KLINIT          ;BRANCH IF NONE
1390  005216  016700  174264          5.0          MOV     NO.DC,R0        ;NUMBER OF DC11'S ON SYSTEM
1391  005222  012701  001252          3.8          MOV     #SW.DC1,R1      ;SELECTED MAP ADR.
1392  005226  016702  174346          5.0          MOV     AD.DC,R2        ;DEVICE ADR
1393  005232  012703  013104          3.8          MOV     #DCDATA,R3      ;DATA TABLE ADR.
1394  005236  012704  000001          3.8  1$:     MOV     #1,R4           ;MARKER
1395  005242  012723  000400          5.2  2$:     MOV     #400,(R3)+      ;INIT DATA TABLE
1396  005246  030411                  3.8          BIT     R4,(R1)         ;CHECK FOR LINE SELECTED
1397  005250  001405                  2.6          BEQ     3$              ;BRANCH IF NOT
1398  005252  012712  003130          5.2          MOV     #3130,(R2)      ;5-BIT, HIGH SPEED, INTENB RCV
1399  005256  012762  000534  000004  6.4          MOV     #534,4(R2)      ;1 STOP CODE, INT ENB XMT, HIGH SPEED MAIN
1400  005264  062702  000010          3.8  3$:     ADD     #10,R2          ;INC TO NEXT DEV ADR.
1401  005270  005300                  2.3          DEC     R0              ;CHECK FOR DONE
1402  005272  001404                  2.6          BEQ     KLINIT          ;BRANCH IF DONE
1403  005274  006304                  2.3          ASL     R4              ;INC TO NEXT UNIT
1404  005276  103361                  2.6          BCC     2$              ;BRANCH IF SAME MAP
1405  005300  005721                  3.2          TST     (R1)+           ;INC TO NEXT MAP
1406  005302  000755                  2.6          BR      1$              ;BRANCH TO RESET MARKER
1407
1408                                        ;TEST KL11'S
1409
1410  005304  005767  173746          4.4  KLINIT: TST     SW.KL           ;CHECK FOR KL11'S SELECTED
1411  005310  001443                  2.6          BEQ     DPINIT          ;BRANCH IF NONE
1412  005312  012701  013432          3.8          MOV     #KLDATA,R1      ;KL DATA STORAGE
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1413  005316  012767  000020  015440      6.4          MOV     #16.,MAX                ;8 WORDS TIMES 2 BYTES = 16
1414  005324  012721  000400              5.2  KLDAT:  MOV     #400,(R1)+      ;TWO BYTES "1" DATA
1415  005330  005367  015430              4.9          DEC     MAX             ;HAVE ALL DATA BUFFERS BEEN INITIALIZED
1416  005334  001373                      2.6          BNE     KLDAT           ;NO
1417
1418  005336  016701  015436              5.0          MOV     KLRSO,R1        ;KL11 RCV STATUS, LINE 0
1419  005342  016702  015426              5.0          MOV     KLXSO,R2        ;KL11 XMT STATUS, LINE 0
1420  005346  012767  000001  015412      6.4          MOV     #1,MARK         ;SET UP MARKER
1421  005354  036767  015406  173674      7.7  KLCSR:  BIT     MARK,SW.KL      ;ACTIVATE THIS TTY
1422  005362  001406                      2.6          BEQ     KLOFF           ;NO
1423  005364  052711  000101              5.2          BIS     #101,@R1        ;INT ENB RDR, RDR ENB
1424  005370  056712  174300              6.4          BIS     KLXSET,@R2      ;INT ENB PUNCH,MAINTENANCE MODE
1425  005374  005761  000002              4.4          TST     2(R1)           ;DBL-BUFFERED FLUSH DL' TYPE BRK/CHARS
1426  005400  062701  000010              3.8  KLOFF:  ADD     #10,R1          ;INC TO NEXT ADRS
1427  005404  062702  000010              3.8          ADD     #10,R2          ;INC TO NEXT ADRS
1428  005410  000241                      1.5          CLC                     ;CLEAR CARRY
1429  005412  006367  015350              4.9          ASL     MARK            ;HAVE ALL BEEN CHECKED
1430  005416  103356                      2.6          BCC     KLCSR           ;NO
1431
1432                                              ;ACTIVATE DP11'S
1433
1434  005420  032767  000010  173620      6.5  DPINIT: BIT     #FL.DP, SW.MAP  ;CHECK FOR DP11'S SELECTED
1435  005426  001461                      2.6          BEQ     DMANIT          ;BRANCH IF NONE
1436  005430  012767  001260  000044      6.4          MOV     #SW.DP1,DPIA+4
1437  005436  012704  014122              3.8          MOV     #DPXMTDATA,R4   ;DP TRANSMITTER DATA
1438  005442  012703  014022              3.8          MOV     #DPRCVDATA,R3   ;DP RCV DATA FILE
1439  005446  012701  174770              3.8          MOV     #174770,R1      ;R1=DP RECEIVER CSR ADRS
1440  005452  012702  174774              3.8          MOV     #174774,R2      ;R2=DP TRANSMITTER CSR ADRS
1441  005456  052767  100000  015274      6.4          BIS     #BIT15,TMPDAT   ;SET UP CONTROL FLAG
1442  005464  005167  015270              4.9  DPIB:   COM     TMPDAT          ;
1443  005470  012767  000001  015270      6.4          MOV     #1,MARK
1444  005476  036737  015264  001260      6.5  DPIA:   BIT     MARK,@#SW.DP1   ;TEST THIS DP LINE
1445  005504  001411                      2.6          BEQ     DPIC            ;NO
1446  005506  052711  000105              5.2          BIS     #105,@R1        ;RCV INT ENB, MAINT MODE STRIP SYNC
1447  005512  116761  007334  000003      7.6          MOVB    TSYNC,3(R1)             ;LOAD SYNC BUFFER
1448  005520  052712  000312              5.2          BIS     #312,@R2        ;INIT TRANSMITTER STATUS
1449                                                                          ;BIT7=DONE
1450                                                                          ;BIT6=INTERRUPT ENABLE
1451                                                                          ;BIT3=TRANSMIT SYNC ON INT
1452                                                                          ;BIT1=IDLE SYNC
1453  005524  105062  000003              4.9          CLRB    3(R2)           ;CLR SYNC EXT
1454  005530  062701  177770              3.8  DPIC:   ADD     #-10,R1         ;INDEX TO NEXT RCV CSR
1455  005534  062702  177770              3.8          ADD     #-10,R2         ;       "   "   "   XMIT   "
1456  005540  005023                      3.7          CLR     (R3)+           ;CLEAR DP RCV DATA FILE
1457  005542  012724  002000              5.2          MOV     #2000,(R4)+     ;INIT SYNC COUNT (4 IN HI-BYTE)
1458  005546  000241                      1.5          CLC                     ;CLEAR CARRY
1459  005550  006367  015212              4.9          ASL     MARK            ;HAS A BANK OF 16 BEEN INT'D
1460  005554  103350                      2.6          BCC     DPIA            ;NO
1461  005556  062767  000002  177716      6.4          ADD     #2,DPIA+4       ;YES, ENTER SECOND BANK
1462  005564  005767  015170              4.4          TST     TMPDAT          ;HAVE ALL 32 BEEN CHECKED
1463  005570  100735                      2.6          BMI     DPIB            ;NO
1464
1465                                          ;DM     INITIALIZATION
1466
1467  005572  005767  173466              4.4  DMANIT: TST     SW.DMA          ;CHECK FOR DM11A'S SELECTED FOR TEST
1468  005576  001002                      2.6          BNE     1$              ;BRANCH IF ANY
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 1469  005600  000167  000534          4.9          JMP     DNINIT          ;OTHERWISE SKIP
 1470
 1471  005604  112767  177777  021422  6.4  1$:     MOVB    #-1,    BINCNT  ;SET  FIRST DATA BYTE TO ALL 1'S
 1472  005612  004567  015230          7.0          JSR     %5,     CLEAR   ;CLEAR TABLE
 1473  005616  014612                               .WORD   DM.LDAT         ;STARTING AT THIS ADDRESS
 1474  005620  000120                               .WORD   80.             ;THIS MANY WORDS
 1475
 1476                                          ;AT THIS POINT THE FOLLOWING TABLES HAVE BEEN CLEARED
 1477                                          ;       DM.LDAT                 ;DM DTAT LIMITS FOR EACH CHANNEL
 1478                                          ;       DM.CAT                  ;ADDRESSES OF CURRENT ADDRESS TABLES
 1479                                          ;       DM.WCT                  ;ADDRESSES OF WORD COUNT TABLES
 1480                                          ;       DM.TT                   ;TUMBLE TABLE POINTERS
 1481                                          ;       DM.RCVDAT               ;RECEIVE DATA FILES
 1482
 1483  005622  105067  173654          4.9          CLRB    ENDTAB          ;FORM MOD400(8) ADRS
 1484  005626  105267  173651          4.9          INCB    ENDTAB+1        ;
 1485  005632  016700  173644          5.0          MOV     ENDTAB, R0      ;R0 = ADRS OF FIRST CAT
 1486  005636  016701  015144          5.0          MOV     DMADRS,R1       ;(R1)= ADRS OF DM CSR ADRS
 1487
 1488  005642  004537  006264          5.8          JSR     %5,@#BMOV               ;BLOCK MOVE
 1489  005646  006250                               DMA.11                  ;FROM THIS ADRS
 1490  005650  014422                               DM.R6                   ;TO THIS ADRS
 1491  005652  000003                               3                       ;THIS MANY WORD
 1492
 1493  005654  012702  014652          3.8          MOV     #DM.CAT,R2      ;(R2)=ADRS OF CAT ADRS'S
 1494  005660  012703  014712          3.8          MOV     #DM.WCT,R3      ;(R3)=ADRS OF WCT ADRS'S
 1495  005664  012704  014752          3.8          MOV     #DM.TT,R4       ;(R4)=TT POINTERS
 1496
 1497                                          ;ACTIVATE LINE 0 OF EACH CHANNEL AND TRANSMIT A
 1498                                          ;CHARACTER OF ALL "1"S TO DETERMINE CHARACTER LENGTH
 1499                                          ;OF EACH CHANNEL
 1500                                          ;
 1501                                          ;NOTE:
 1502                                          ;       IF DEVICE FAILS TO RESPOND PROGRAM WILL HANG UP
 1503                                          ;
 1504
 1505  005670  012767  000001  015070  6.4          MOV     #1,MARK         ;SETUP CHANNEL ACTIVE POINTER
 1506  005676  036737  015064  001264  6.5  DMA.0:  BIT     MARK,@#SW.DMA   ;TEST CHANNEL 0 FOR ACTIVATION
 1507  005704  001437                    2.6          BEQ     DMA.1           ;BRANCH IF CH 0 NOT SELECTED
 1508
 1509  005706  012710  027234          5.2          MOV     #BINCNT,@R0     ;LOAD CAT WITH ADRS OF BINARY COUNT
 1510  005712  010012                    3.7          MOV     R0,@R2          ;SAVE CAT ADRS IN CAT ADRS TABLE
 1511  005714  062700  000040          3.8          ADD     #40,R0          ;(R0)=ADRS OF WORD COUNT TABLE (WCT)
 1512  005720  010023                    3.7          MOV     R0,(R3)+        ;SAVE WCT ADRS IN WCT ADRS TABLE
 1513  005722  012710  177777          5.2          MOV     #-1,@R0         ;SET LINE 0 WORD COUNT = ONE
 1514  005726  062700  000140          3.8          ADD     #140,R0         ;(R0)=TUMBLE TABLE ADRS
 1515  005732  010024                    3.7          MOV     R0,(R4)+        ;SAVE TT ADRS IN TT ADRS TABLE
 1516  005734  012767  000100  014754  6.4          MOV     #100,CNT        ;TT WORD COUNT
 1517  005742  005020                    3.7  DMA.00: CLR     (R0)+           ;CLEAR TT ENTRY
 1518  005744  005367  014746          4.9          DEC     CNT             ;DEC TT WORD COUNT
 1519  005750  001374                    2.6          BNE     DMA.00          ;BRANCH IF TT NOT CLEARED
 1520  005752  042721  000001          5.8          BIC     #BIT0,(R1)+     ;ZERO TT POINTER ,INC TO BAR
 1521  005756  005721                    3.2          TST     (R1)+           ;INC TO BCR
 1522  005760  042721  177777          5.8          BIC     #177777,(R1)+   ;CLEAR ALL BREAK BITS
 1523  005764  012221                    5.2          MOV     (R2)+,  (R1)+   ;LOAD BASE ADRS REG WITH CAT ADRS
 1524  005766  052761  000105  177770  6.4          BIS     #105,   -10(R1) ;SET RCV INTERRUPT ENABLE, MAINT,GO
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1525  005774  052761  000001  177772      6.4          BIS     #BIT0,  -6(R1)  ;ACTIVATE LINE 0, BAR
1526  006002  000405                      2.6          BR      DMA.2
1527
1528  006004  062701  000010              3.8  DMA.1:  ADD     #10,R1          ;INC R1 TO NEXT CSR ADRS
1529  006010  005722                      3.2          TST     (R2)+           ;INC CAT ADRS TABLE POINTER
1530  006012  005723                      3.2          TST     (R3)+           ;INC WCT ADRS TABLE POINTER
1531  006014  005724                      3.2          TST     (R4)+           ;INC TT POINTER TABLE POINTER
1532
1533  006016  006367  014744              4.9  DMA.2:  ASL     MARK            ;SHIFT CH POINTER TO NEXT CH
1534  006022  103325                      2.6          BCC     DMA.0           ;CONTINUE UNTIL ALL 16 CH CHECKED
1535  006024  012701  014612              3.8          MOV     #DM.LDAT,R1
1536  006030  012767  000001  014730      6.4          MOV     #1,     MARK
1537  006036  033767  022766  173220      6.5  DMA.3:  BIT     @#MARK, SW.DMA
1538  006044  001402                      2.6          BEQ     DMA.13
1539  006046  005711                      3.2          TST     (R1)
1540  006050  001776                      2.6          BEQ     .-2
1541  006052  005721                      3.2  DMA.13: TST     (R1)+
1542  006054  006367  014706              4.9          ASL     MARK
1543  006060  103366                      2.6          BCC     DMA.3
1544  006062  004567  000176              7.0          JSR     %5,BMOV         ;REINSTATE RCV ISR
1545  006066  006256                                   DMA.12
1546  006070  014422                                   DM.R6
1547  006072  000003                                   3
1548
1549                                      ;DM11 NPR CORE INITIALIZATION
1550
1551  006074  112767  000000  021132      6.4          MOVB    #0,BINCNT       ;RESTORE DATA FILE
1552  006102  016701  014700              5.0          MOV     DMAADRS,R1      ;FIRST DM CSR ADRS
1553  006106  012702  014652              3.8          MOV     #DM.CAT,R2      ;TABLE OF CURRENT ADRS TABLE
1554  006112  012703  014712              3.8          MOV     #DM.WCT,R3      ;TABLE OF WORD COUNT TABLE
1555  006116  012705  014752              3.8          MOV     #DM.TT,R5       ;TABLE OF TUMBLE TABLE
1556  006122  012704  014612              3.8          MOV     #DM.LDAT,R4     ;WORD COUNT
1557  006126  012767  000001  014632      6.4          MOV     #1,MARK
1558  006134  036767  014626  173122      7.7  DMA.10: BIT     MARK,SW.DMA     ;ACTIVATE THIS LINE?
1559  006142  001427                      2.6          BEQ     DMA.8
1560  006144  012267  000020              6.4          MOV     (R2)+,DMA.4     ;CAT ADRS
1561  006150  012367  000026              6.4          MOV     (R3)+,DMA.5     ;WCT ADRS
1562  006154  005114                      3.7          COM     @R4             ;
1563  006156  012467  000016              6.4          MOV     (R4)+,DMA.6     ;WCT
1564
1565  006162  004567  000124              7.0          JSR     %5,LOAD         ;LOAD
1566  006166  027234                                   BINCNT                  ;BINARY COUNT ADRS
1567  006170  000000                      DMA.4:       OPEN                    ;INTO CAT
1568  006172  000020                                   16.                     ;
1569
1570  006174  004567  000112              7.0          JSR     %5,LOAD         ;LOAD
1571  006200  000000                      DMA.6:       OPEN                    ;DATA LIMIT INTO
1572  006202  000000                      DMA.5:       OPEN                    ;WORD COUNT TABLE (WCT)
1573  006204  000020                                   16.                     ;WORT COUNT TABLE (WCT)
1574
1575  006206  012721  010105              5.2          MOV     #010105,(R1)+   ;RCV+XMT INT ENB,MAINT,GO
1576  006212  052721  177777              5.2          BIS     #177777,(R1)+   ;ACTIVATE ALL LINES
1577  006216  022121                      4.7          CMP     (R1)+,  (R1)+   ;INC TO NEXT CSR
1578  006220  000405                      2.6          BR      DMA.9
1579
1580  006222  005722                      3.2  DMA.8:  TST     (R2)+           ;INC TO NEXT CAT ADRS
```

```
1581  006224  005723                    3.2          TST     (R3)+           ;INC TO NEXT WCT ADRS
1582  006226  005724                    3.2          TST     (R4)+           ;INC TO NEXT WCT
1583  006230  062701  000010            3.8          ADD     #10,R1          ;INC TO NEXT CSR
1584  006234  006367  014526            4.9  DMA.9:  ASL     MARK            ;SHIFT CH POINTER TO NEXT CH
1585  006240  103335                    2.6          BCC     DMA.10          ;BRANCH IF NOT END CH
1586  006242  010067  173234            4.9          MOV     R0,     ENDTAB  ;SAVE END OF CODE
1587  006246  000434                    2.6          BR      DNINIT          ;GO SET UP NON-COMM DEVICES
1588
1589                                                ;*****************************************************************
1590                                                ;THIS CODE WILL BE MOVED INTO THE DM.RCV ISR IN ORDER TO
1591                                                ;ESTABLISH THE CHARACTER SIZE AND THEREFORE DATA LIMIT
1592                                                ;OF EACH CHANNEL
1593
1594  006250  111561  014612            6.4  DMA.11: MOVB    @R5,DM.LDAT(R1) ;LOAD RECEIVED DATA INTO
1595  006254  000421                    2.6          BR      .+44            ;DATA LIMIT
1596                                                                         ;ALL 1'S WERE TRANSMITTED
1597                                                                         ;THEREFORE THIS CHARACTER
1598                                                                         ;SHOULD REPRESENT THE MAX
1599                                                                         ;WORD COUNT (DATA LIMIT)FOR
1600                                                                         ;THIS PARTICULAR CHANNEL
1601
1602                                                ;*****************************************************************
1603
1604                                                ;RESTORATION CODE
1605
1606  006256  121561  015012            5.9  DMA.12: CMPB    @R5,DM.RDAT(R1) ;NORMAL RUNNING CODE FOR RCV.ISR
1607  006262  001401                    2.6          BEQ     .+4
1608
1609                                                ;*****************************************************************
1610
1611                                                ;BMOV,  BLOCK MOVE ROUTINE
1612
1613  006264  004767  014654            7.0  BMOV:   JSR     PC,     SAVRG   ;SAVE REGISTERS
1614  006270  012501                    3.8          MOV     (R5)+,R1        ;FETCH SOURCE ADRS
1615  006272  012502                    3.8          MOV     (R5)+,R2        ;FETCH DESTINATION ADRS
1616  006274  012503                    3.8          MOV     (R5)+,R3        ;FETCH WORD COUNT
1617  006276  012122                    5.2  T.B1:   MOV     (R1)+,(R2)+     ;MOVE
1618  006300  005303                    2.3          DEC     R3              ;DEC WORD COUNT
1619  006302  001375                    2.6          BNE     T.B1            ;BRANCH IF BLOCK NOT MOVED
1620  006304  004767  014656            7.0          JSR     PC,     RSTRG   ;RESTORE R0-R4
1621  006310  000205                    3.5          RTS     %5              ;RETURN
1622
1623  006312  004767  014626            7.0  LOAD:   JSR     PC,     SAVRG
1624  006316  012501                    3.8          MOV     (R5)+,R1        ;FETCH DATA
1625  006320  012502                    3.8          MOV     (R5)+,R2        ;FETCH DESTINATION ADRS
1626  006322  012503                    3.8          MOV     (R5)+,R3        ;FETCH WORD COUNT
1627  006324  010122                    3.7  T.LOD1: MOV     R1,(R2)+        ;LOAD DATA
1628  006326  005303                    2.3          DEC     R3              ;DEC WORD COUNT
1629  006330  001375                    2.6          BNE     T.LOD1          ;BRANCH IF LOAD NOT COMPLETE
1630  006332  004767  014630            7.0          JSR     PC,     RSTRG   ;RESTORE REG
1631  006336  000205                    3.5          RTS     %5              ;RETURN
1632
1633                                                ;ACTIVATE DN11'S
1634  006340  005767  172722            4.4  DNINIT: TST     SW.DN           ;CHECK FOR ANY DN11'S SELECTED
1635  006344  001446                    2.6          BEQ     DXINIT
1636  006346  012701  015242            3.8          MOV     #DNDATA,R1
```

```
1637  006352  012702  175200          3.8          MOV     #175200,R2
1638  006356  012767  000001  014402  6.4          MOV     #1,MARK
1639  006364  036737  014376  001266  6.5  DNPR1:  BIT     MARK,@#SW.DN
1640  006372  001415                  2.6          BEQ     DNPR2
1641  006374  012704  000004          3.8          MOV     #4,     R4          ;SET UP COUNTER
1642  006400  105021                  3.7  DNPR4:  CLRB    (R1)+               ;CLEAR PONTER TABLE
1643  006402  012712  000111          5.2          MOV     #111,   (R2)        ;SET INTENB, MAINT, FCRQ
1644  006406  056722  006730          6.4          BIS     DNXMTD, (R2)+       ;MOVE DATA BITS INTO CSR
1645  006412  005304                  2.3          DEC     R4                  ;COUNT LINES
1646  006414  001371                  2.6          BNE     DNPR4               ;BRANCH IF MORE
1647  006416  052762  000004  177770  6.4          BIS     #BIT2,  -10(R2)     ;SET MASTER INTERUPT ENABLE
1648  006424  000403                  2.6          BR      DNPR3
1649  006426  022121                  4.7  DNPR2:  CMP     (R1)+,  (R1)+       ;ADD 4 TO R1
1650  006430  062702  000010          3.8          ADD     #10,    %2
1651  006434  006367  014326          4.9  DNPR3:  ASL     MARK
1652  006440  103351                  2.6          BCC     DNPR1
1653  006442  000407                  2.6          BR      DXINIT
1654                                              ;DX11 INITIALIZATION
1655
1656  006444  000000                              DX.OLF: 0                   ;DX11 ON-LINE FLAGS
1657  006446  000000                              SPW:    0                   ;ADRS OF STATUS POINTER WORD
1658  006450  000000                              TT:     0                   ;ADRS OF TUMBLE TABLE
1659  006452  000000                              TTTT:   0                   ;TT TRACE TABLE
1660  006454  000000                              DST:    0                   ;ADRS OF DEVICE STATUS TABLE
1661  006456  000000                              DXDAT:  0                   ;ADRS OF DX NPR DATA FILE
1662  006460  000000                              DCTA:   0                   ;ADRS OF DEVICE CONTROL TABLE AREA
1663
1664  006462  005767  172606          4.4  DXINIT: TST     SW.DX               ;CHECK FOR ANY DX11'S
1665  006466  001002                  2.6          BNE     DXI.0
1666  006470  000167  000534          4.9          JMP     DLINIT
1667
1668  006474  052767  001777  173000  6.4  DXI.0:  BIS     #1777,ENDTAB
1669  006502  005267  172774          4.9          INC     ENDTAB
1670  006506  016767  172770  177732  7.6          MOV     ENDTAB,SPW
1671  006514  062767  001000  172760  6.4          ADD     #1000,ENDTAB
1672  006522  016767  172754  177720  7.6          MOV     ENDTAB,TT
1673  006530  062767  001000  172744  6.4          ADD     #1000,ENDTAB
1674  006536  016767  172740  177706  7.6          MOV     ENDTAB,TTTT
1675  006544  062767  001000  172730  6.4          ADD     #1000,ENDTAB
1676  006552  016767  172724  177674  7.6          MOV     ENDTAB,DST
1677  006560  062767  000400  172714  6.4          ADD     #256.,ENDTAB
1678  006566  016767  172710  177662  7.6          MOV     ENDTAB,DXDAT
1679  006574  062767  000400  172700  6.4          ADD     #256.,ENDTAB
1680  006602  016701  177642          5.0          MOV     TT,R1               ;BOTTOM OF TT
1681  006606  005021                  3.7  CL1:    CLR     (R1)+               ;CLEAR TT
1682  006610  020167  177640          4.4          CMP     R1,DST              ;TEST FOR END OF TT TRACE TABLE
1683  006614  001374                  2.6          BNE     CL1                 ;BRANCH IF NOT END
1684  006616  016777  177624  010560  8.8          MOV     SPW,@DXOS           ;LOAD DX OFFSET REG
1685
1686                                              ;DST    DEVICE STATUS TABLE SETUP
1687
1688                                              ;SET DST TO CU FIRST
1689
1690  006624  012701  000400          3.8          MOV     #256.,R1            ;FILL DST WITH UC
1691  006630  016702  177620          5.0          MOV     DST,R2
1692  006634  112722  000002          5.2  DS.4:   MOVB    #UC,(R2)+
```

```
1693  006640  005301                    2.3          DEC     R1
1694  006642  001374                    2.6          BNE     DS.4
1695
1696                                                 ;SET SPW TO ALL UC ALSO
1697
1698  006644  016701  177576            5.0          MOV     SPW,R1  ;SPW IMMEDIATE UNIT CHECK
1699  006650  012702  000400            3.8          MOV     #256.,R2
1700  006654  012721  000002            5.2  DS.5:   MOV     #UC,(R1)+
1701  006660  005302                    2.3          DEC     R2
1702  006662  001374                    2.6          BNE     DS.5
1703
1704  006664  016701  177564            5.0  DS.0:   MOV     DST,R1
1705  006670  012727  000020            5.2          MOV     #16.,(PC)+
1706  006674  000000                         DS.1:   0
1707  006676  012702  017572            3.8          MOV     #CMD.STAT,R2
1708  006702  112221                    5.2  DS.2:   MOVB    (R2)+,(R1)+
1709  006704  005367  177764            4.9          DEC     DS.1
1710  006710  001374                    2.6          BNE     DS.2
1711
1712
1713
1714                                                 ;DX11 ON LINE INITIALIZATION
1715
1716  006712  005767  177526            4.4  DXOLI:  TST     DX.OLF          ;TEST FOR OFF/ON LINE TEST
1717  006716  001527                    2.6          BEQ     DXOFLI                  ;BRANCH IF OFFLINE
1718  006720  012767  177770  000022    6.4          MOV     #-DEVNUM,NUMDEV
1719
1720                                                 ;THE FOLLOWING CODE CHECKS MEMORY SIZE FOR 8K SYSTEMS
1721                                                 ;IT REDUCES THE NUMBER OF ONLINE DEVICES FOR TEST TO 1.
1722                                                 ;I.E. IF ONLINE AND 8K OF MEMORY SET NONL = 1
1723
1724  006726  032737  140000  001504    5.3          BIT     #140000,@#ENDCOR        ;TEST MORE THAN 8K OF MEMORY
1725  006734  001006                    2.6          BNE     CX1$            ;(YES) BRANCHES
1726
1727  006736  012737  000001  007174    5.2          MOV     #1,@#NONL       ;(NO)  REDUCE NUMBER OF DEVICES ON LINE TO 1.
1728  006744  012727  177776            5.2          MOV     #177776,(PC)+
1729  006750  177770                         NUMDEV: 177770
1730
1731  006752  005067  007232            4.9  CX1$:   CLR     DEV                     ;START POLLING DEV 0
1732  006756  005067  007250            4.9          CLR     WAIT
1733  006762  016701  177462            5.0          MOV     TT,TTP                  ;INIT TT POINTER
1734  006766  010167  007234            4.9          MOV     TTP,SAVTTP              ;SAVE TT POINTER
1735  006772  016767  172504  177460    7.6          MOV     ENDTAB,DCTA             ;START OF DEV CNTL TBL ADRS
1736
1737                                                 ;INITIALIZE SOFTWARE TABLES
1738  007000  013702  007174            3.8          MOV     @#NONL,T1               ;GET # OF DEVICES
1739  007004  016700  177450            5.0          MOV     DCTA,   DCT             ;START OF AREA
1740  007010  012703  017632            3.8          MOV     #DCTP,  T2              ;START OF DCTP TABLE
1741
1742  007014  010023                    3.7  INIT2:  MOV     DCT,    (T2)+           ;STORE ADDRESS OF DCT
1743  007016  012704  000420            3.8          MOV     #DCTZ,  T3              ;CLEAR OUT THIS DCT
1744  007022  105020                    3.7  INIT1:  CLRB    (DCT)+                  ;
1745  007024  005304                    2.3          DEC     T3                      ;
1746  007026  001375                    2.6          BNE     INIT1                   ;
1747  007030  005302                    2.3          DEC     T1                      ;GO FOR NEXT DCT
1748  007032  001370                    2.6          BNE     INIT2                   ;TILL ALL DONE
```

```
1749  007034  013067  172442          4.9          MOV     DCT,ENDTAB
1750
1751
1752
1753                                               ;PUT FIRST NONL DEVICES ONLINE
1754
1755  007040  013702  007174          3.8          MOV     @#NONL, T1              ;GET # OF DEVS
1756  007044  012703  017632          3.8          MOV     #DCTP,  T2              ;START WITH DEV #0
1757  007050  017704  007154          6.2          MOV     @CU,    T3              ;GET 1ST SPW ENTRY
1758  007054  006304                  2.3          ASL     T3                      ;
1759  007056  066704  177364          5.0          ADD     SPW,    T3              ;OFFSET SPW
1760
1761  007062  012300                  3.8  INIT3:  MOV     (T2)+,  DCT             ;GET DCT
1762  007064  012760  177777  000006  6.4          MOV     #-1,    ONLF(DCT)       ;SET FLAG
1763  007072  016724  177356          6.4          MOV     DST,    (T3)+           ;SET UP SPW WITH DST
1764
1765  007076  005302                  2.3          DEC     T1                      ;DO NEXT TILL DONE
1766  007100  001370                  2.6          BNE     INIT3                   ;
1767
1768                                               ;SET DXCS ACCORDING TO MODE
1769  007102  012777  000001  010272  7.6          MOV     #1,@DXCS                ;DXRESET
1770  007110  112777  000100  177336  7.6          MOVB    #SM,    @DST            ;RESPONSE TO TIO IS SM FOR 2703
1771  007116  005077  010260          6.1          CLR     @DXCS                   ;CLEAR OUT DXCS BITS
1772  007122  052777  020000  010252  7.6          BIS     #ENDEN, @DXCS
1773  007130  005767  007070          4.4          TST     MODE                    ;2703?
1774  007134  001410                  2.6          BEQ     INIT4                   ;YES - JUST PUT ONLINE
1775  007136  052777  004000  010236  7.6          BIS     #BSYEN, @DXCS           ;CUBSY ENABLED FOR 2848
1776  007144  042777  020000  010230  8.2          BIC     #ENDEN, @DXCS
1777  007152  105077  177276          6.1          CLRB    @DST                    ;RESPONSE TO TIO IS 0 FOR 2848
1778
1779  007156  052777  001000  010216  7.6  INIT4:  BIS     #ONLINA,@DXCS           ;PUT DX ONLINE
1780  007164  052777  000100  010210  7.6          BIS     #100,@DXCS              ;INTEN
1781  007172  000416                  2.6          BR      DLINIT
1782
1783
1784  007174  000004                       NONL:   4                               ;NUMBER OF DEVICES TO PUT ONLINE
1785
1786                                               ;OFFLINE INITIALIZATION
1787
1788
1789  007176  012777  000001  010176  7.6  DXOFLI: MOV     #1,@DXCS
1790  007204  004767  006324          7.0          JSR     PC,CLRDXD               ;CLEAR DX DATA FILE
1791  007210  012777  100525  010174  7.6          MOV     #100525,@DXMO           ;LOAD BUSO WITH DATA PATTERN
1792  007216  052777  000100  010156  7.6          BIS     #100,@DXCS
1793  007224  004767  006324          7.0          JSR     PC,DXGO
1794                                               ;INITIALIZE DL11C, DL11D, DL11E
1795
1796  007230  032767  001000  172010  6.5  DLINIT: BIT     #FL.DLC,SW.MAP          ;CHECK FOR DL11'S
1797  007236  001500                  2.6          BEQ     DJINIT                  ;BRANCH IF NONE
1798  007240  016700  172272          5.0          MOV     NO.DLC,R0               ;NUMBER OF DL11'S ON SYSTEM
1799  007244  012701  001276          3.8          MOV     #SW.DL1,R1              ;SELECTED MAP ADR
1800  007250  016702  172354          5.0          MOV     AD.DLC,R2               ;DEVICE ADR
1801  007254  012703  020114          3.8          MOV     #DLDATA,R3              ;DATA TABLE ADR
1802  007260  012704  000001          3.8  1$:     MOV     #1,R4                   ;MARKER
1803  007264  012723  000400          5.2  2$:     MOV     #400,(R3)+              ;INIT DATA TABLE
1804  007270  030411                  3.8          BIT     R4,(R1)                 ;CHECK FOR LINE SELECTED
```

```
1805  007272  001450                    2.6          BEQ     3$                ;BRANCH IF NOT
1806  007274  012762  000004  000004    5.4          MOV     #4,     4(R2)     ;SET MAINTENANCE MODE
1807  007302  005067  000126            4.9          CLR     DLYCNT            ;CLEAR COUNTER
1808  007306  105762  000004            4.4  4$:     TSTB    4(R2)             ;TST FOR XMIT READY
1809  007312  100404                    2.6          BMI     5$                ;BRANCH IF SET
1810  007314  005267  000114            4.9          INC     DLYCNT            ;COUNT
1811  007320  001372                    2.6          BNE     4$                ;BRANCH IF NOT LONG ENOUGH
1812
1813  007322  104000                                 HLT                       ;XMIT READY NEVER CAME UP
1814
1815  007324  012762  000037  000006    6.4  5$:     MOV     #37,    6(R2)     ;SEND A CHARACTER
1816  007332  005067  000076            4.9          CLR     DLYCNT            ;CLR COUNTER
1817  007336  105712                    3.2  6$:     TSTB    (R2)              ;TEST FOR RCV DONE
1818  007340  100404                    2.6          BMI     7$                ;BRANCH WHEN DONE
1819  007342  005267  000066            4.9          INC     DLYCNT            ;TIME OUT COUNTER
1820  007346  001373                    2.6          BNE     6$                ;BRANCH IF OK
1821
1822  007350  104000                                 HLT                       ;DONE NEVER CAME UP
1823                                                                            ;EXPECTED BREAK CHARACTER
1824                                                                            ;MODEM TIED IN OR PULLUP VOLTAGE MISSING
1825
1826  007352  016267  000002  000056    7.6  7$:     MOV     2(R2),  SAVE      ;RECORD RCV DATA
1827  007360  122767  000037  000050    5.9          CMPB    #37,    SAVE      ;CHECK DATA
1828  007366  001405                    2.6          BEQ     8$                ;BRANCH IF OK
1829  007370  022767  120000  000040    5.9          CMP     #120000,SAVE      ;TEST FOR BREAK
1830  007376  001757                    2.6          BEQ     6$                ;BRANCH IF BREAK
1831
1832  007400  104000                                 HLT                       ;ILLEGAL CHARACTER.  SHOULD BE #120000, OR #37
1833
1834  007402  052762  000100  000004    6.4  8$:     BIS     #100,   4(R2)     ;SET XMIT INT ENB
1835  007410  012712  000100            5.2          MOV     #100,(R2)         ;RCV. INT ENB
1836  007414  062702  000010            3.8  3$:     ADD     #10,R2            ;INC TO NEXT DEV ADR.
1837  007420  005300                    2.3          DEC     R0                ;CHECK FOR DONE
1838  007422  001406                    2.6          BEQ     DJINIT            ;BRANCH IF DONE
1839  007424  006304                    2.3          ASL     R4                ;INC TO NEXT UNIT
1840  007426  103316                    2.6          BCC     2$                ;BRANCH IF SAME MAP
1841  007430  005721                    3.2          TST     (R1)+             ;INC TO NEXT MAP
1842  007432  000712                    2.6          BR      1$                ;BRANCH TO RESET MARKER
1843
1844  007434  000000                        DLYCNT:  0                         ;DELAY COUNTER
1845  007436  000000                        SAVE:    0                         ;DATA SAVER
```

```
                                                .SBTTL          DJ11 INITIALIZATION


                                                ;INITIALIZE DJ11

007440  032767  004000  171600      6.5  DJINIT: BIT     #FL.DJ, SW.MAP  ;CHECK FOR DJ11'S
007446  001500                      2.6          BEQ     ANCNIT          ;BRANCH IF NONE

007450  004567  013372              7.0          JSR     %5,     CLEAR   ;CLEAR DJ TABLES
007454  030420                               .WORD   DJ.XTBL         ;START ADDRESS
007456  000256                               .WORD   256             ;THIS MANY WORDS

007460  016767  172054  000156      7.6          MOV     NO.DJ,  DJ.CNT  ;NO. OF DJ'S
007466  005000                      2.3          CLR     R0              ;INITIALIZE INDEX >R0
007470  012701  001302              3.8          MOV     #SW.DJ, R1      ;SELECT MAP ADDRESS >R1
007474  016702  172132              5.0          MOV     AD.DJ,  R2      ;DEVICE BASE ADDRESS >R2
007500  012703  031022              3.8          MOV     #DJ.EXP,R3      ;EXPECTED DATA TABLE >R3
007504  012704  000001              3.8          MOV     #1,     R4              ;DEVICE CURSOR >R4

007510  005067  011012              4.9          CLR     DJ.XTLY         ;CLR XMIT TALLY COUNTER
007514  005067  011010              4.9          CLR     DJ.RTLY         ;CLR RECV TALLY COUNTER

007520  030411                      3.8  1$:     BIT     R4,     (R1)    ;CHECK CURRENT DEVICE SELECTED
007522  001444                      2.6          BEQ     5$              ;NO BRANCHES


007524  005067  000112              4.9          CLR     DJLINE          ;
007530  016062  001456  000004      7.6          MOV     SW.DJ0(R0),4(R2)        ;SET DJTCR LINE SCAN CONTROL (XMIT)

007536  000240                      1.5          NOP                     ;******

007540  012767  000001  000100      6.4          MOV     #1,DJ.BNT       ;LINE CURSOR

007546  005013                      3.7  2$:     CLR     (R3)            ;INITIALIZE
007550  036760  000072  001456      7.7          BIT     DJ.BNT, SW.DJ0(R0)      ;CHECK CURRENT LINE SELECTED
007556  001405                      2.6          BEQ     3$              ;BRANCH IF NOT

007560  016713  000056              6.4          MOV     DJLINE, (R3)    ;SET LINE#
007564  000313                      3.7          SWAB    (R3)            ;TO LINE FIELD 11 THRU 8
007566  052713  100000              5.2          BIS     #BIT15, (R3)    ;SET VALID DATA BIT

007572  005267  000044              4.9  3$:     INC     DJLINE          ;ADVANCE LINE INDEX
007576  005723                      3.2          TST     (R3)+           ;ADVANCE TABLE INDEX

007600  006367  000042              4.9          ASL     DJ.BNT          ;NEXT POSITION
007604  103360                      2.6          BCC     2$              ;TEST LINE GROUP COMPLETED
                                            ;       SET DJCSR REG BITS      15   14  12      8   6   3   2   0
007606  012712  150515              5.2          MOV     #150515,(R2)    ;XMT XMT STATUS SCN RCV CLR MAIN RCV
                                            ;                               ;RDY INT ENABLE ENB INT MOS ENB  ENB

007612  062700  000002              3.8  4$:     ADD     #2,     R0      ;ADVANCE INDEX
007616  006304                      2.3          ASL     R4              ;DEVICE CURSOR
007620  062702  000010              3.8          ADD     #10,    R2      ;ADVANCE TO NEXT DEVICE ADDRESS
007624  005367  000014              4.9          DEC     DJ.CNT          ;CHECK SCAN COMPLETED

007630  001333                      2.6          BNE     1$              ;NO BRANCHES
```

```
1902
1903  007632  000406                    2.6          BR      ANCNIT          ;YES INITIALIZE ANCILLARIES
1904
1905  007634  062703  000040            3.8  5$:     ADD     #40,    R3      ;ADVANCE TABLE INDEX
1906  007640  000764                    2.6          BR      4$              ;CONTINUE
1907
1908  007642  000000                         DJLINE: 0                       ;LINE INDEX
1909  007644  000000                         DJ.CNT: 0                       ;DEVICE COUNTER
1910  007646  000000                         DJ.BNT: 0                       ;LINE CURSOR
1911
1912
1913
1914                                         ;INITIALIZE ANCILLARIES
1915                                         ;NOTE:
1916                                         ;       UNCONDITIONAL EXECUTION OF THE FOLLOWING
1917                                         ;CODE ASSURES THAT ALL DEVICES WILL HAVE RESPONDED
1918                                         ;DURING QUICK VERIFICATION SELECTION. (I.E. SWITCHES
1919                                         ;#11, #9, #8.)
1920
1921
1922                                         ;INITIALIZE DISK AND DECTAPE DATA FILES
1923
1924  007650  005067  013030            4.9  ANCNIT: CLR     FSEG            ;CLEAR SEGMENT COUNT
1925  007654  012767  024234  013026    6.4          MOV     #BUFF,DFILE     ;INIT DATA FILE ADDRESS
1926  007662  012767  000001  013022    6.4  DATINT: MOV     #1,ONE          ;MAKE ONE = 1
1927  007670  012767  000001  013010    6.4          MOV     #1,FDATA        ;INIT FILE DATA
1928  007676  012767  000101  012776    6.4          MOV     #101,LIMIT      ;INIT DATA LIMIT
1929  007704  016777  012776  012776    8.8  DI1:    MOV     FDATA,@DFILE    ;STORE DATA
1930  007712  062767  000002  012770    6.4          ADD     #2,DFILE        ;INC DATA ADDRESS TO NEXT WORD
1931  007720  005167  012762            4.9          COM     FDATA           ;1'S COMPLEMENT
1932  007724  016777  012756  012756    8.8          MOV     FDATA,@DFILE    ;STORE DATA
1933  007732  062767  000002  012750    6.4          ADD     #2,DFILE        ;INC DATA ADDRESS TO NEXT WORD
1934
1935  007740  005167  012742            4.9          COM     FDATA           ;1'S COMPLEMENT DATA
1936  007744  066767  012742  012734    7.6          ADD     ONE,FDATA       ;ADD ONE (OR -1) TO DATA
1937  007752  026767  012730  012722    7.1          CMP     FDATA,LIMIT     ;FIRST HALF OF DATA COMPLETE
1938  007760  001351                    2.6          BNE     DI1             ;NO
1939  007762  005267  012716            4.9          INC     FSEG
1940  007766  022767  000006  012710    5.9          CMP     #6,FSEG         ;ALL DATA FILES INITIALIZED
1941  007774  001414                    2.6          BEQ     CTYNIT          ;BRANCH IF DONE
1942  007776  032767  000001  012700    6.5          BIT     #1,FSEG         ;DECREMENT DATA
1943  010004  001726                    2.6          BEQ     DATINT
1944  010006  012767  177777  012666    6.4          MOV     #-1,LIMIT       ;INIT LOWER LIMIT (-0) OF DATA
1945  010014  005367  012666            4.9          DEC     FDATA           ;DEC TO 100
1946  010020  005167  012662            4.9          COM     FDATA           ;FDATA=1'S COM OF 100
1947  010024  000727                    2.6          BR      DI1
1948
1949                                        ;TEST CTY INITIALIZE
1950
1951  010026  032767  000001  171214    6.5  CTYNIT: BIT     #BIT0,SW.ANC    ;TEST CTY
1952  010034  001430                    2.6          BEQ     LPINIT          ;NO
1953  010036  012737  020614  000060    5.2          MOV     #CTYR,@#60
1954  010044  016737  171606  000062    6.4          MOV     BR.CTY,@#62
1955  010052  012737  020534  000064    5.2          MOV     #CTYP,@#64
1956  010060  016737  171572  000066    6.4          MOV     BR.CTY,@#66
1957  010066  012767  000001  010626    6.4          MOV     #1,CTKDAT       ;INIT KEYBOARD DATA
```

```
 1958  010074  012767  000000  010510   6.4           MOV     #0,CTPDAT       ;INIT PUNCH DATA
 1959  010102  052777  000100  012706   7.6           BIS     #BIT6,@CTPS     ;INT ENB PUNCH
 1960  010110  052777  000101  012674   7.6           BIS     #101,@CTKS      ;INT ENBRDR, RDRENB
 1961
 1962                                                ;INITIALIZE LINE PRINTER
 1963
 1964  010116  032767  000002  171124   6.5  LPINIT:  BIT     #BIT1,SW.ANC    ;TEST LINE PRINTER
 1965  010124  001422                     2.6           BEQ     TCINIT          ;NO
 1966  010126  012737  020742  000200   5.2           MOV     #LPVECT,@#200   ;INITIALIZE INT VECTOR
 1967  010134  016737  171520  000202   6.4           MOV     BR.LP,  @#202   ;PRIORITY=4
 1968  010142  016767  010564  010566   7.6           MOV     LPSIZE, CHRLIN  ;FIRST LINE CHARACTER COUNT
 1969  010150  016767  010556  010556   7.6           MOV     LPSIZE, LINGTH  ;LINE LENGHT
 1970  010156  012767  000040  010554   6.4           MOV     #40,CARGEN      ;FIRST CHARACTER
 1971  010164  052777  000100  010534   7.6           BIS     #100,@LPS       ;INT ENB
 1972
 1973                                                ;INITIALIZE TC11 DECTAPE
 1974
 1975  010172  032767  000004  171050   6.5  TCINIT:  BIT     #BIT2,SW.ANC    ;ACTIVATE DECTAPE
 1976  010200  001431                     2.6           BEQ     RFINIT
 1977  010202  012777  021142  010672   7.6           MOV     #FENDZ,@TCIV
 1978  010210  016777  171446  010666   8.8           MOV     BR.TC,  @TCPRT
 1979  010216  012701  021124            3.8           MOV     #SAT,R1         ;R1 FIRST TC COMMAND CONTROL WORD
 1980  010222  042721  003400            5.8  USEL:    BIC     #3400,(R1)+     ;CLEAR UNIT SELECT NUMBER
 1981  010226  022701  021140            3.8           CMP     #REVRN,R1       ;ALL CONTROL WORDS INITIALIZED
 1982  010232  001373                     2.6           BNE     USEL            ;NO
 1983  010234  005737  000042            3.2           TST     @#42            ;CHECK ACT11 MONITOR
 1984  010240  001403                     2.6           BEQ     NACT            ;NO BRANCHES
 1985
 1986  010242  052767  000400  010670   6.4           BIS     #400,   REVRN   ;YES SELECT DEVICE #1
 1987
 1988  010250  016777  010664  010612   8.8  NACT:    MOV     REVRN,@TCCM     ;REVERSE
 1989                                                                        ;READ BLOCK NUMBER
 1990                                                                        ;INTERRUPT ENABLE
 1991                                                                        ;DO
 1992  010256  012767  000000  010626   6.4           MOV     #0,TCFIRST      ;FIRST BLOCK #
 1993                                              ;RF11 DISK?
 1994
 1995  010264  032767  000010  170756   6.5  RFINIT:  BIT     #BIT3,  SW.ANC  ;ACTIVATE RF12
 1996  010272  001417                     2.6           BEQ     RKINIT          ;NO
 1997  010274  012737  021720  000204   5.2           MOV     #RFISR,@#204
 1998  010302  016737  171356  000206   6.4           MOV     BR.RF,@#206
 1999  010310  005067  011374            4.9           CLR     SERV            ;ZERO SERVICE QUEUE
 2000  010314  005067  011372            4.9           CLR     LOWADR          ;CLEAR LSB'S OF DISK ADDRESS (RF11)
 2001  010320  005067  011370            4.9           CLR     UPADRS          ;CLEAR MSB'S OF DISK ADDRESS (RF11)
 2002  010324  052777  000100  011336   7.6           BIS     #BIT6,@DCS      ;DISK INTERRUPT ENABLE
 2003                                              ;ACTIVATE RK11 DISK
 2004  010332  032767  000020  170710   6.5  RKINIT:  BIT     #BIT4,  SW.ANC  ;TEST RK11
 2005  010340  001432                     2.6           BEQ     RPINIT
 2006  010342  032777  000040  011762   7.7           BIT     #40,@RKDS               ;TEST WRITE PROTECT SWITCH
 2007  010350  001401                     2.6           BEQ     .+4             ;BYPASS
 2008  010352  104000                                   HLT                     ;HALT WRITE PROTECTED
 2009  010354  012737  022424  000220   5.2           MOV     #RKISR,@#220
 2010  010362  016737  171300  000222   6.4           MOV     BR.RK,@#222
 2011  010370  012767  043503  012112   6.4           MOV     #43503,RKFUNCTION ;WRITE AND WRITE CHECK
 2012  010376  016777  012112  011742   8.8           MOV     LLIMIT,@RKBAR   ;
 2013  010404  016777  012102  011732   8.8           MOV     RKWORDCT,@RKWC
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2014  010412  012777  000000  011716    7.6           MOV     #0,@RKDAE
2015  010420  012777  000103  011722    7.6           MOV     #103,@RKCSR
2016
2017                                                ;ACTIVATE RP11 DISK 0
2018  010426  032767  000040  170614    6.5  RPINIT:  BIT     #BIT5,  SW.ANC  ;CHECK FOR RP11 SELECTED
2019  010434  001435                      2.6           BEQ     OVERLY          ;BRANCH FOR NONE
2020  010436  012737  022536  000254    5.2           MOV     #RPISR,@#254
2021  010444  016737  171220  000256    6.4           MOV     BR.RP,@#256
2022  010452  012767  043503  012220    6.4           MOV     #43503,RPFUNC    ;WRITE/WRITE CHECK DISK
2023  010460  016777  012030  012042    8.8  RPD:     MOV     LLIMIT,@RPBAR
2024  010466  016777  012204  012032    8.8           MOV     RPWORDCT,@RPWC
2025  010474  012777  000015  012030    7.6           MOV     #00015,@RPCSR   ;HOME
2026  010502  105777  012024            5.6           TSTB    @RPCSR
2027  010506  100375                      2.6           BPL     .-4             ;CONTROL READY
2028  010510  005777  012006            5.6           TST     @RPDSR
2029  010514  100375                      2.6           BPL     .-4             ;UNIT DRIVE READY
2030  010516  005077  012000            6.1           CLR     @RPDSR          ;CLR ATTENTION
2031  010522  012777  000103  012002    7.6           MOV     #103,@RPCSR
2032
2033                                                ;FOREGROUND OVERLAY ROUTINES
2034                                                ;INITIALIZE AND PRIME DEVICE
2035  010530  005737  001020            3.2  OVERLY:  TST     @#OVINIT                ;TEST INITIALIZATION REQUIRED
2036  010534  001405                      2.6           BEQ     PRIME           ;NO BRANCHES
2037  010536  013737  001020  010546    5.2           MOV     @#OVINIT,@#LINKOI+2;YES SET LINKAGE JSR ENTRY
2038  010544  004737  001020            5.8  LINKOI:  JSR     PC,@#OVINIT     ;LINKOI+2 = (OVINIT)
2039
2040  010550  005737  001022            3.2  PRIME:   TST     @#OVPRIM                ;TEST DEVICE PRIME REQUIRED
2041  010554  001405                      2.6           BEQ     CORNIT          ;NO BRANCHES
2042  010556  013737  001022  010566    5.2           MOV     @#OVPRIM,@#LINKOP+2;YES SET LINKAGE JSR ENTRY
2043  010564  004737  001022            5.8  LINKOP:  JSR     PC,@#OVPRIM     ;LINKOP+2 = (OVPRIM)
2044
2045                                                ;ROUTINE TO LOAD EXCESS CORE WITH WORSE CASE MEMORY TEST.
2046
2047  010570  005767  001150            4.4  CORNIT:  TST     IOTSAV          ;CHECK FOR OVERLAY
2048  010574  001403                      2.6           BEQ     1$              ;BRANCH IF NONE
2049  010576  012767  057400  170676    6.4           MOV     #57400, ENDTAB  ;START OF MEMORY TEST ROUTINE NOW STARTS AFTER 0
2050  010604  013700  001504            3.8  1$:      MOV     @#ENDCOR, R0    ;GET HIGHEST USEABLE CORE ADDRESS
2051  010610  013701  001502            3.8           MOV     @#ENDTAB,       R1      ;GET END OF CORE USED BY PROGRAM
2052  010614  020001                      2.3           CMP     R0,     R1      ;IS THERE ENOUGH ROOM?
2053  010616  103420                      2.6           BLO     XMRTS           ;IF NOT BRANCH
2054  010620  012702  010700            3.8  XMLOP1:  MOV     #MEMTST,R2      ;MOVE THE CODE BETWEEN
2055  010624  012221                      5.2  XMLOP2:  MOV     (R2)+,  (R1)+   ;MEMTST AND MEMEND 'TILL
2056  010626  026162  177776  177776    7.1           CMP     -2(R1), -2(R2)  ;VALIDATE CORRECT VALUE STORED
2057  010634  001403                      2.6           BEQ     XMLOP3          ;OK BRANCHES
2058
2059  010636  014103                      5.0           MOV     -(R1),  R3      ;WAS TO R3
2060  010640  014204                      5.0           MOV     -(R2),  R4      ;SHOULD BE TO R4
2061                                                ;SUGGEST YOU RUN MEMORY TESTS
2062  010642  104004                                    HLT+4                   ;DISPLAY REGISTERS
2063
2064  010644  022702  010752            3.8  XMLOP3:  CMP     #MEMEND,R2      ;CORE IS FULL
2065  010650  001365                      2.6           BNE     XMLOP2          ;
2066  010652  000240                      1.5           NOP                     ;PATCH FOR TRACE
2067  010654  020100                      2.3           CMP     R1,     R0      ;HOW ARE WE DOING ON MEMORY
2068  010656  101760                      2.6           BLOS    XMLOP1
2069  010660  012721  000137            5.2  XMRTS:   MOV     #137,(R1)+      ;SET UP JMP @# TO RETURN TO BCKGND
```

```
2070  010664  012721  011716          5.2          MOV     #OVERL,(R1)+
2071  010670  005021                  3.7          CLR     (R1)+
2072  010672  005021                  3.7          CLR     (R1)+
2073  010674  000207                  3.5          RTS     PC                  ;RETURN TO MAINLINE
2074
2075  010676  151456                               ROTVAL: 151456
2076
2077  010700  000277                  1.5  MEMTST: SCC                         ;SET CARRY BIT
2078  010702  012727  123456          5.2          MOV     #123456,(PC)+       ;MEMDAT CONTAINS VALUE
2079  010706  151456                               MEMDAT: 151456              ;WORKING STORRAGE
2080  010710  106067  177773          4.9          RORB    MEMDAT+1                    ;ROTATE LEFT BYTE OF MEMDAT
2081  010714  103401                  2.6          BCS     .+4
2082  010716  104000                               HLT                         ;C BIT WAS NOT SET
2083  010720  102001                  2.6          BVC     .+4
2084  010722  104000                               HLT                         ;V BIT WAS SET
2085  010724  022767  151456  177754  5.9          CMP     #151456,MEMDAT      ;CHECK HERE FOR CORRECT ROTATE BYTE
2086  010732  001401                  2.6          BEQ     .+4
2087  010734  104000                               HLT                         ;ROTATE FAILED
2088  010736  026737  177744  010676  5.9          CMP     MEMDAT, @#ROTVAL    ;CHECK AGAIN, REFERENCING LOW MEMORY
2089  010744  001401                  2.6          BEQ     .+4
2090  010746  104000                               HLT                         ;REF: TO LOW MEMORY FAILED
2091  010750  104400                               SCOPE
2092  010752                          MEMEND:
2093
2094                                  ;****************************** DEVICE ******************************
```

```
                                        ;****************************** BCKGND ******************************
                                        ;BCKGND, BACKGROUND ROUTINE TO VERIFY SILENT DEVICES
                                        ;       ARE RUNNING AND DISK AND DECTAPE DATA CHECKS
                                        ;****************************** BCKGND ******************************
010752  012767  000140  167316    6.4   BCKGND: MOV     #140,PS         ;SET PRIORITY TO LEVEL 3
010760  012701  024234              3.8           MOV     #BUFF,R1        ;COMMON OUTPUT BUFFER
010764  012702  026234              3.8           MOV     #INBFTC,R2      ;TC11 INPUT BUFFER
010770  012703  025234              3.8           MOV     #INBFRF,R3      ;RF11, INPUT BUFFER
010774  021122                      4.7   1$:     CMP     (R1),(R2)+      ;TC11 DATA OK
010776  001401                      2.6           BEQ     .+4             ;YES
011000  104000                              HLT                             ;NO, REPORT ERROR
011002  022123                      4.7           CMP     (R1)+,(R3)+     ;RF11 DATA OK
011004  001401                      2.6           BEQ     .+4             ;YES
011006  104000                              HLT                             ;NO, REPORT ERROR
011010  022701  025234              3.8           CMP     #BUFF+1000,R1   ;TESTED ENTIRE BUFFER
011014  001367                      2.6           BNE     1$              ;NO
011016  005067  170156              4.9   2$:     CLR     ICNT
011022  005067  013042              4.9           CLR     LAD                             ;SCOPE
                                                                                        DN11 BACKGROUND
011026  005767  170234              4.4   DNACT:  TST     SW.DN           ;CHECK FOR DN11'S
011032  001422                      2.6           BEQ     DM11BB          ;BRANCH IF NONE
011034  104400                              SCOPE
011036  012701  015242              3.8           MOV     #DNDATA,R1      ;START AT END OF DN DATA TABLE
011042  016702  170542              5.0           MOV     AD.DN,R2
011046  016703  170444              5.0           MOV     NO.DN,R3
011052  006303                      2.3           ASL     R3              ;X2
011054  006303                      2.3           ASL     R3              ;X4
011056  105721                      3.2   DNBK1:  TSTB    (R1)+           ;CHECK FOR ACTIVE FLAG
011060  100004                      2.6           BPL     DNBK2           ;BRANCH IF NOT
011062  105041                      4.9           COMB    -(R1)           ;RESTORE DATA POINTER
011064  112104                      3.8           MOVB    (R1)+,  R4      ;RETREIVE IT
011066  056412  015342              6.4           BIS     DNXMTD(4),(2)   ;TRANSMIT, INTERUPT ENABLED
011072  005722                      3.2   DNBK2:  TST     (R2)+
011074  005303                      2.3           DEC     R3
011076  003367                      2.6           BGT     DNBK1


                                        ;DM11-BB MODEM CONTROL MULTIPLEXER
                                        ;SCANNER LOGIC TEST
                                        ;INPUT 1'S INTO ALL SCANNER MEMORY LOCATIONS
                                        ;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE

                004000                  CLRSCN=4000
                002000                  CLRMUX=2000
                001000                  MAINT=1000
                000400                  STEP=400
                000100                  INTENA=100
                000040                  SCNENA=40
                000200                  DONE=200
                000020                  BUSY=20
011100  005767  170164              4.4   DM11BB: TST     SW.DMB                  ;CHECK FOR DM11BB'S
011104  001470                      2.6           BEQ     KGSTRT                  ;BRANCH IF NONE
```

```
2151  011106  104400                                    SCOPE
2152  011110  005001                          2.3       CLR     R1
2153  011112  016702  170474                  5.0       MOV     AD.DMB,R2
2154  011116  012767  000001  011642          6.4       MOV     #1,MARK
2155  011124  036767  011636  170136          7.7 DMBTOP: BIT     MARK,SW.DMB
2156  011132  001447                          2.6       BEQ     DMBBOT
2157  011134  012712  006000                  5.2 SCNT1:  MOV     #CLRMUX+CLRSCN,(R2)
2158  011140  032712  000020                  5.3       BIT     #BUSY,(R2)              ;CLEAR ALL MULTIPLEXER FLIPFLOPS
2159  011144  001374                          2.6       BNE     .-6
2160  011146  012700  000020                  3.8       MOV     #16.,R0                 ;SET UP TO WRITE 1'S INTO
2161  011152  005012                          3.7       CLR     (R2)                    ;ALL LINE ENABLE FLIPFLOPS
2162  011154  012762  000001  000002          6.4 SCNT1A: MOV     #1,2(R2)                ;SET FLIPFLOP
2163  011162  052712  000400                  5.2       BIS     #STEP,(R2)              ;GO TO NEXT LINE
2164  011166  005300                          2.3       DEC     R0
2165  011170  001371                          2.6       BNE     SCNT1A
2166  011172  012705  171340                  3.8       MOV     #171340,R5
2167  011176  012700  000020                  3.8       MOV     #16.,R0
2168  011202  012712  001117                  5.2       MOV     #MAINT+INTENA+17,(R2)   ;SET INTERRUPT ENABLE AND MAINTENANCE MO
2169  011206  052767  000200  166562          6.4 SCNT1B: BIS     #200,PS                 ;INHIBIT INTERRUPTS
2170  011214  052712  000040                  5.2       BIS     #SCNENA,(R2)            ;START SCANNER
2171  011220  042767  000200  166550          7.0       BIC     #200,PS
2172  011226  105712                          3.2       TSTB    (R2)
2173  011230  100375                          2.6       BPL     .-4
2174  011232  020512                          3.2       CMP     R5,(R2)
2175  011234  001401                          2.6       BEQ     SCNT1D
2176  011236  104000                                    HLT                             ;SCANNER LOGIC ERROR
2177  011240  042712  000240                  5.8 SCNT1D: BIC     #SCNENA+DONE,(R2)       ;CLEAR SCAN ENABLE AND DONE
2178  011244  005205                          2.3       INC     R5                      ;UPDATE EXPECTED RESULT
2179  011246  005300                          2.3       DEC     R0                      ;CONTINUE IF NOT DONE
2180  011250  001356                          2.6       BNE     SCNT1B
2181  011252  005721                          3.2 DMBBOT: TST     (R1)+
2182  011254  062702  000010                  3.8       ADD     #10,    R2      ;UPDATE DM11BB ADDRESS POINTER
2183  011260  006367  011502                  4.9       ASL     MARK
2184  011264  103317                          2.6       BCC     DMBTOP
2185
2186                                                ;KG11-A CYCLIC REDUNDANCY CHECK OPTION
2187                                                ;TEST THE RESULTS OF CRC16, CCITT, AND CRC12 BY COMPARING
2188                                                ;KNOWN RESULTS AGAINST HARDWARE GENERATED DATA
2189
2190  011266  005767  170000                  4.4 KGSTRT: TST     SW.KG               ;CHECK FOR ANY KG11'S
2191  011272  001567                          2.6       BEQ     BCKCOR                      ;SKIP IF NONE
2192  011274  104400                                    SCOPE
2193  011276  005001                          2.3       CLR     R1
2194  011300  016702  170310                  5.0       MOV     AD.KG,R2
2195  011304  012767  000001  011454          6.4       MOV     #1,MARK
2196  011312  036767  011450  167752          7.7 KGTOP:  BIT     MARK,SW.KG
2197  011320  001440                          2.6       BEQ     KGEND
2198  011322  012700  011444                  3.8 KGTEST: MOV     #KGIP,R0                ;INSRTUCTION TO BE EXECUTED
2199  011326  012703  011452                  3.8       MOV     #KGDP,R3                ;TABLE OF DATA
2200  011332  012704  011512                  3.8       MOV     #KGCP,R4                ;TABLE OF RESULTS
2201  011336  012712  000020                  5.2 KGTA:   MOV     #20,(R2)                ;CLEAR BCC REGISTER
2202  011342  011012                          5.2       MOV     (R0),(R2)               ;SET UP CSR FROM INSTRUCTION TABLE
2203  011344  011362  000004                  6.4       MOV     (R3),4(R2)              ;SEND DATA TO DEVICE
2204                                                                                    ;START BCC COMPUTATION
2205  011350  105712                          3.2       TSTB    (R2)                    ;TEST FOR DONE
2206  011352  100023                          2.6       BPL     KGEND           ;(NO) CONTINUE WITH NEXT
```

```
                                                                        ;DEVICE WILL BE REPORTED AS NOT RUNNING
011354  016267  000002  000060      7.6           MOV     2(R2),  KGTEMP          ;READ RESULTS OF BCC
011362  021467  000054              5.9           CMP     (R4),   KGTEMP          ;COMPARE EXPECTED AND RECEIVED RESULTS
011366  001401                      2.6           BEQ     .+4
011370  104000                                    HLT                             ;BCC INCORRECT, ERROR

011372  022324                      4.7           CMP     (R3)+,  (R4)+           ;ADVANCE DATA AND RESULT POINTERS
011374  020327  011512              3.2           CMP     R3,     #KGCP           ;END OF DATA
011400  001356                      2.6           BNE     KGTA                    ;NO, CONTINUE
011402  012703  011452              3.8           MOV     #KGDP,  R3              ;RESET DATA POINTER
011406  022067  000036              5.9           CMP     (R0)+,KGC12             ;ADVANCE INSTRUCTION POINTER
011412  001351                      2.6           BNE     KGTA
011414  052761  000200  001342      6.4           BIS     #FL.KG, MAP(R1) ;SET RUN MAP FLAG
011422  005721                      3.2   KGEND:  TST     (R1)+
011424  062702  000010              3.8           ADD     #10,    R2      ;UPDATE KG11 ADDRESS POINTER
011430  006367  011332              4.9           ASL     MARK
011434  103326                      2.6           BCC     KGTOP
011436  000167  000210              4.9           JMP     BCKCOR

011442  000000                      KGTEMP: 0
011444  000111                      KGIP:   000111                          ;CRC16 INSTRUCTION WORD
011446  000115                      KGCIT:  000115                          ;CCITT INSTRUCTION WORD
011450  000100                      KGC12:  000100                          ;CRC12 INSTRUCTION WORD

                                            ;DATA TABLE FOR CRC TESTS

011452  000401                      KGDP:   000401
011454  177376                              177376
011456  001002                              001002
011460  176775                              176775
011462  002004                              002004
011464  175773                              175773
011466  004010                              004010
011470  173767                              173767
011472  010020                              010020
011474  167757                              167757
011476  020040                              020040
011500  157737                              157737
011502  040100                              040100
011504  137677                              137677
011506  100200                              100200
011510  077577                              077577

                                            ;RESULT TABLE FOR CRC16

011512  050300                      KGCP:   050300
011514  160301                              160301
011516  120600                              120600
011520  010601                              010601
011522  001403                              001403
011524  131402                              131402
011526  003006                              003006
011530  133007                              133007
011532  006014                              006014
011534  136015                              136015
011536  014030                              014030
```

```
 2263  011540  124031                                          124031
 2264  011542  030060                                          030060
 2265  011544  100061                                          100061
 2266  011546  060140                                          060140
 2267  011550  150141                                          150141
 2268
 2269                                                          ;RESULT TABLE FOR CCITT
 2270
 2271  011552  004121                                          004121
 2272  011554  174351                                          174351
 2273  011556  010242                                          010242
 2274  011560  160032                                          160032
 2275  011562  020504                                          020504
 2276  011564  150774                                          150774
 2277  011566  041210                                          041210
 2278  011570  131060                                          131060
 2279  011572  102420                                          102420
 2280  011574  072650                                          072650
 2281  011576  001061                                          001061
 2282  011600  171211                                          171211
 2283  011602  002142                                          002142
 2284  011604  172332                                          172332
 2285  011606  004304                                          004304
 2286  011610  174174                                          174174
 2287
 2288                                                  ;RESULT TABLE FOR CRC12
 2289  011612  024051                                          024051
 2290  011614  030061                                          030061
 2291  011616  024421                                          024421
 2292  011620  030411                                          030411
 2293  011622  025041                                          025041
 2294  011624  031071                                          031071
 2295  011626  026401                                          026401
 2296  011630  032431                                          032431
 2297  011632  021001                                          021001
 2298  011634  035031                                          035031
 2299  011636  036001                                          036001
 2300  011640  022031                                          022031
 2301  011642  000000                                          000000
 2302  011644  014030                                          014030
 2303  011646  000000                                          000000
 2304  011650  014030                                          014030
 2305
 2306  011652  032737  001000  177570   5.3  BCKCOR:  BIT     #BIT9,  @#SWR   ;CHECK MEMORY TEST INHIBIT
 2307  011660  001007                    2.6           BNE     EXPND3          ;SW(9) SET BYPASS MEMORY TEST
 2308  011662  104400                                  SCOPE
 2309  011664  005000                    2.3           CLR     R0              ;START AT 0
 2310  011666  005520                    3.7  COREX:   ADC     (R0)+           ;FAST READ/WRITE ON ALL MEMORY
 2311  011670  001376                    2.6           BNE     COREX           ;CHECK FOR A HALT
 2312  011672  026700  167606            5.0           CMP     ENDCOR, R0      ;CHECK FOR END
 2313  011676  101373                    2.6           BHI     COREX           ;BRANCH IF NOT
 2314  011700  032737  000400  177570   5.3  EXPND3:  BIT     #BIT8,  @#SWR   ;CHECK MEMORY TEST INHIBIT
 2315  011706  001003                    2.6           BNE     OVERL           ;SW(8) SET BYPASS MEMORY TEST
 2316
 2317  011710  104400                                  SCOPE
 2318  011712  000177  167564            6.1           JMP     @ENDTAB         ;DO WORST NOISE TEST ON EXCESS MEMORY
```

```
                                                                                ;MEMORY TEST


                                                        ;IOT TRAPS TO OVERLAY BACKGROUND
                                                        ;IF ONE EXISTS
011716  005767  000022          4.4   OVERL:  TST     IOTSAV          ;TEST FOR BACKGROUND OVERLAY
011722  001411                  2.6           BEQ     TABTRN          ;NOT OVERLAY BRANCH
011724  013746  177776          6.4           MOV     @#PS,-(R6)      ;YES PUT CURRENT STATUS ON STACK
011730  012746  011746          6.4           MOV     #TABTRN,-(R6)   ;PUT RETURN ON STACK FOR RTI
011734  012767  011742  012126  6.4           MOV     #ZO,    LAD     ;INITIALIZE SCOPE LINKAGE
011742  000137                  3.7   ZO:     JMP     @(R7)+          ;LINK TO BACKGROUND PSEUDO IOT

011744  000000                        IOTSAV: 0                       ;BACKGROUND OVERLAY START ADDRESS

011746  004567  011074          7.0   TABTRN: JSR     %5,CLEAR
011752  001310                                RU.DC1                  ;START HERE
011754  000015                                MAPSIZ-2                ;THIS MANY WORDS
011756  012700  001310          3.8           MOV     #RU.DC1,R0
011762  012702  001542          3.8           MOV     #MX.DC,R2
011766  004567  000536          7.0           JSR     %5,TRANSP
011772  000002                                FL.DC
011774  004567  000530          7.0           JSR     %5,TRANSP
012000  000004                                FL.KL
012002  004567  000522          7.0           JSR     %5,TRANSP
012006  000010                                FL.DP
012010  004567  000514          7.0           JSR     %5,TRANSP
012014  000020                                FL.DMA
012016  004567  000506          7.0           JSR     %5,TRANSP
012022  000040                                FL.DN
012024  004567  000500          7.0           JSR     %5,TRANSP
012030  000100                                FL.DMB
012032  004567  000472          7.0           JSR     %5,TRANSP
012036  000200                                FL.KG
012040  012702  001570          3.8           MOV     #MX.DX,R2
012044  004567  000460          7.0           JSR     %5,TRANSP
012050  000400                                FL.DX
012052  005767  174366          4.4           TST     DX.OLF          ;CHECK FOR DX ON LINE
012056  001403                  2.6           BEQ     Z1
012060  052767  000001  167244  6.4           BIS     #1,RU.DX                ;FORCE SET DX RUN FLAG
012066  004567  000436          7.0   Z1:     JSR     %5,TRANSP
012072  001000                                FL.DLC
012074  004567  000430          7.0           JSR     %5,TRANSP
012100  004000                                FL.DJ
012102  004567  010740          7.0           JSR     %5,CLEAR
012106  001342                                MAP
012110  000040                                32.
012112  012701  001250          3.8           MOV     #SW.ANC,R1
012116  012702  001306          3.8           MOV     #RU.ANC,R2
012122  012703  000016          3.8           MOV     #MAPSIZ-1,R3
012126  012767  030052  000070  6.4           MOV     #MSGMAP,TYDEV
012134  022122                  4.7   MONIT:  CMP     (R1)+,(R2)+
012136  001457                  2.6           BEQ     MONIT1

                                        ;THE FOLLOWING CODE ALLOWS ADDITIONAL TIME FOR LOW SPEED
                                        ;DOUBLE BUFFERED DEVICES TO RESPOND ON FIRST PASS UNDER
                                        ;ACT11 (MONITOR MODE). I.E. QUICK VERIFICATION.
```

```
2375
2376  012140  005737  001204          3.2          TST     @#PASSES        ;TEST FIRST PASS
2377  012144  001014                  2.6          BNE     MONITX          ;(NO) BRANCHES
2378
2379  012146  005727                  3.2          TST     (PC)+           ;MONITOR MODE
2380  012150  000000                          MONITZ: 0                       ;STALL FLAG
2381  012152  001011                  2.6          BNE     MONITX          ;(INACTIVE) BRANCHES
2382  012154  024142                  7.1          CMP     -(R1),-(R2)     ;RESTORE
2383  012156  062737  000001  012150  5.2    1$:   ADD     #1,@#MONITZ     ;DELAY
2384
2385  012164  022737  177777  012150  4.7          CMP     #177777,@#MONITZ        ;HERE
2386  012172  001371                  2.6          BNE     1$
2387
2388  012174  000757                  2.6          BR      MONIT           ;TRY ONCE MORE
2389
2390  012176  005267  167000          4.9    MONITX: INC     ERRORS
2391  012202  032737  020000  177570  5.3          BIT     #BIT13, @#SWR   ;CHECK FOR INHIBIT TYPEOUT
2392  012210  001032                  2.6          BNE     MONIT1
2393  012212  004767  000364          7.0          JSR     PC,     CTYDWN
2394  012216  000004  030022                       TYPE,   MSGDNR
2395  012222  000004                               TYPE
2396  012224  000000                      TYDEV:   0
2397                                               ;                       ;DEVICE NOT RUNNING
2398  012226  014105                  5.0          MOV     -(R1),TTY       ;PUT -(R1) INTO TTY
2399  012230  004767  011322          7.0          JSR     PC,BITYP$       ;TYPE -(R1) IN BITS
2400  012234  000004  027642                       TYPE,   SPACE+3
2401  012240  014205                  5.0          MOV     -(R2),TTY       ;PUT -(R2) INTO TTY
2402  012242  004767  011310          7.0          JSR     PC,BITYP$       ;TYPE -(R2) IN BITS
2403
2404
2405  012246  005737  000042          3.2          TST     @#42            ;CHECK ACT11 MONITOR
2406  012252  001406                  2.6          BEQ     2$              ;NO BRANCHES
2407
2408  012254  005112                  3.7          COM     (R2)            ;EXTRACT DEVICE(S) NOT RUNNING MASK*
2409  012256  041211                  5.8          BIC     (R2),(R1)       ;SHUT DOWN DEVICE(S) NOT RUNNING
2410  012260  005112                  3.7          COM     (R2)            ;RESTORE ACTIVITY
2411
2412  012262  012737  177777  001024  5.2          MOV     #177777,@#CLINK ;RESET MONITOR PASS CONTROL
2413
2414  012270  022122                  4.7    2$:   CMP     (R1)+,(R2)+
2415  012272  004767  000336          7.0          JSR     PC,     CTYUP
2416  012276  062767  000020  177720  6.4    MONIT1: ADD     #20,    TYDEV   ;UPDATE POINTER TO NEXT MESSAGE
2417  012304  005303                  2.3          DEC     R3
2418  012306  003312                  2.6          BGT     MONIT
2419  012310  005067  166772          4.9          CLR     RU.ANC          ;CLEAR ANC RUN FLAG
2420  012314  005267  166664          4.9          INC     PASSES          ;UPDATE PASS COUNTER
2421  012320  032737  020000  177570  5.3          BIT     #BIT13, @#SWR   ;CHECK FOR INHIBIT TYPEOUT
2422  012326  001024                  2.6          BNE     BELL1           ;BRANCH IF SET
2423  012330  004767  000246          7.0          JSR     PC,     CTYDWN
2424  012334  000004  027634                 PASEND: TYPE,   RETURN          ;TYPE CR-LF
2425  012340  016705  166640          5.0          MOV     PASSES,TTY      ;TYPE PASSES IN OCTAL
2426  012344  004767  011226          7.0          JSR     PC,PRINTS       ;AND SUPRESS LEADING ZERO'S
2427  012350  000004  027743                       TYPE,   MSGPAS          ;TYPE " PASSES, "
2428  012354  016705  166622          5.0          MOV     ERRORS,TTY      ;TYPE ERRORS IN OCTAL
2429  012360  004767  011212          7.0          JSR     PC,PRINTS       ;AND SUPRESS LEADING ZERO'S
2430  012364  000004  027760                       TYPE,   MSGERR          ;TYPE " ERRORS."
```

```
2431  012370  000004  027634                        TYPE,   RETURN          ;TYPE CR-LF
2432  012374  004767  000234          7.0           JSR     PC,     CTYUP
2433  012400  032767  002000  165162  6.5   BELL1:  BIT     #BIT10,SWR      ;CHECK FOR INHIBIT BELL
2434  012406  001006                  2.6           BNE     BELL2
2435  012410  004767  000166          7.0           JSR     PC,     CTYDWN
2436  012414  000004  000207                        TYPE    ,BELL           ;TYPE THE CHARACTER BELL
2437  012420  004767  000210          7.0           JSR     PC,     CTYUP
2438  012424  005737  000042          3.2   BELL2:  TST     @#42            ;TEST CONTENTS OF 42 (SOFT VECTOR)
2439  012430  001435                  2.6           BEQ     HOOK            ;BRANCH IF NO MONITOR
2440  012432  005737  001024          3.2           TST     @#CLINK         ;TEST MONITOR CONTROL
2441  012436  001007                  2.6           BNE     BELL3           ;QUICK PASS BYPASS
2442  012440  005737  012722          3.2           TST     @#XLINK         ;TEST REPORT FLAG
2443  012444  001404                  2.6           BEQ     BELL3           ;CLEARED BYPASS
2444  012446  004767  000216          7.0           JSR     PC,     SYSRPT  ;REPORT CONFIGURATION TESTED
2445  012452  005037  012722          3.7           CLR     @#XLINK         ;CLEAR REPORT FLAG
2446  012456  005037  001024          3.7   BELL3:  CLR     @#CLINK         ;CLEAR MONITOR CONTROL
2447  012462  022737  040000  000042  4.7           CMP     #40000,@#42     ;TEST PSEUDO MONITOR
2448  012470  001401                  2.6           BEQ     1$              ;(YES) OVERLAY BRANCHES
2449  012472  000005                  1.5           RESET                   ;(NO) ACT11/DDT RESET
2450  012474  013700  000042          3.8   1$:     MOV     @#42,   %0      ;INITIALIZE FOR
2451  012500  004710                  5.8   PROEND: JSR     %7,     (0)     ;RETURN TO MONITOR
2452  012502  000240                  1.5           NOP                     ;ROOM FOR OVERLAY
2453  012504  000240                  1.5           NOP
2454  012506  000240                  1.5           NOP
2455  012510  022737  040000  000042  4.7           CMP     #40000,@#42     ;TEST PSEUDO MONITOR
2456  012516  001402                  2.6           BEQ     HOOK            ;(YES) BYPASS
2457  012520  004767  172370          7.0           JSR     PC,DEVICE       ;RESTART DEVICES MONITOR RETURN
2458  012524  000167  176222          4.9   HOOK:   JMP     BCKGND          ;REPEAT
2459
2460
2461  012530  012503                  3.9   TRANSP: MOV     (R5)+,R3        ;GET FLAG
2462  012532  012267  010226          6.4           MOV     (R2)+,MAX       ;GET MAX NO DEVICE
2463  012536  012701  001342          3.8           MOV     #MAP,R1         ;GET MAP POINTER
2464  012542  012704  000001          3.8   TR1:    MOV     #1,R4           ;GET RUN MAP MARKER
2465  012546  030321                  3.8   TR2:    BIT     R3,(R1)+        ;CHECK FOR FLAG
2466  012550  001403                  2.6           BEQ     TR3
2467  012552  050410                  3.7           BIS     R4,(R0)
2468  012554  050367  166524          4.9           BIS     R3,RU.MAP
2469  012560  005367  010200          4.9   TR3:    DEC     MAX
2470  012564  001404                  2.6           BEQ     TR4
2471  012566  006304                  2.3           ASL     R4
2472  012570  103366                  2.6           BCC     TR2
2473  012572  005720                  3.2           TST     (R0)+
2474  012574  000762                  2.6           BR      TR1
2475  012576  005720                  3.2   TR4:    TST     (R0)+
2476  012600  000205                  3.5           RTS     R5
2477
2478  012602  032767  000001  166440  6.5   CTYDWN: BIT     #BIT0,  SW.ANC  ;CHECK FOR CTY
2479  012610  001410                  2.6           BEQ     1$              ;NO BRANCHES
2480  012612  042777  000100  010176  8.2           BIC     #BIT6,  @CTPS   ;CLEAR PUNCH INT ENB
2481  012620  004767  000036          7.0           JSR     PC,     WAITER  ;WAIT
2482  012624  042777  000100  010160  8.2           BIC     #BIT6,  @CTKS   ;CLEAR READER INT ENB
2483  012632  000207                  3.5   1$:     RTS     PC
2484
2485  012634  032767  000001  166406  6.5   CTYUP:  BIT     #BIT0,  SW.ANC  ;CHECK FOR CTY
2486  012642  001406                  2.6           BEQ     2$              ;NO BRANCHES
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2487  012644  052777  000100  010144      7.6          BIS     #BIT6, @CTPS
2488  012652  052777  000100  010132      7.6          BIS     #BIT6, @CTKS
2489  012660  000207                      3.5  2$:     RTS     PC
2490
2491  012662  000004  030412                   WAITER: TYPE,   PADDERS          ;INSERT PADDER CHARACTERS (377
2492  012666  000207                      3.5          RTS     PC
2493
2494  012670  004767  177706              7.0  SYSRPT: JSR     PC,     CTYDWN
2495  012674  000004  027665                           TYPE,   MSGX             ;OUTPUT DZQCA-F TESTED
2496  012700  000004  027714                           TYPE,   MSG1             ;SYSTEMS CONFIGURATION
2497  012704  012701  OC1250              3.8          MOV     #SW.ANC,R1       ;CURRENT SELECTION TABLE
2498  012710  004767  010156              7.0          JSR     PC,     REPORT   ;OUTPUT
2499  012714  004767  177714              7.0          JSR     PC,     CTYUP
2500  012720  000207                      3.5          RTS     PC               ;RETURN
2501
2502  012722  177777                           XLINK:  177777                   ;ONE PASS CONTROL FLAG (ACTIVE)
2503
2504
2505  012724  000000                           COUNT1: 0
2506  012726  000000                           COUNT2: 0
2507
2508                                           ;****** COMMUNICATION INTERRUPT SERVICE ROUTINES (ISR'S) *****
2509
2510                                           ;COMM ISR ARE ENTERED THROUGH THE FOLLOWING INSTRUCTIONS
2511                                           ;
2512                                           ;       JSR     %5,DEV.ISR       ;JUMP TO DEVICE ISR
2513                                           ;       LINE NUMBER              ;THIS IS YOUR LINE NUMBER
2514                                           ;
2515                                           ;THEREFORE, THE FIRST TASK OF THE ISR'S IS TO FETCH
2516                                           ;THE LINE NUMBER TO DETERMINE WHICH LINE TO SERVICE.
2517
2518
2519                                                ;DC11 DATASET TRANSMITTER SERVICE ROUTINE
2520
2521  012730  010146                      4.9  DC.XMT: MOV     R1,-(SP)         ;SAVE REGISTER 1 ON STACK
2522  012732  010246                      4.9          MOV     R2,-(SP)         ;SAVE REGISTER 2 ON STACK
2523  012734  011501                      3.8          MOV     (R5),R1
2524  012736  006301                      2.3          ASL     R1               ;FORM MOD(2) INDEX
2525  012740  010102                      2.3          MOV     R1,R2            ;DUPLICATE LINE NUMBER
2526  012742  006302                      2.3          ASL     R2               ;FORM MOD10(8) INDEX
2527  012744  006302                      2.3          ASL     R2               ;
2528  012746  062702  174004              3.8          ADD     #174004,R2       ;FORM DEVICE ADDRESS
2529  012752  105712                      3.2          TSTB    @R2              ;TEST FOR TRANS DONE INC TO BUFF
2530  012754  100401                      2.6          BMI     .+4              ;YES
2531  012756  104000                                   HLT                      ;NO.  REPORT ERROR, PC, PS,
2532  012760  105261  013104              4.9          INCB    DCDATA(R1)       ;INCREMENT SAVE DATA
2533  012764  005722                      3.2  DCOUT:  TST     (R2)+            ;INC TO XMIT BUFF
2534  012766  116112  013104              6.4          MOVB    DCDATA(R1),(R2)  ;TRANSMIT DATA
2535  012772  000167  005216              4.9          JMP     CLEANUP
2536
2537                                                ;DC11 DATASET RECEIVER SERVICE ROUTINE
2538
2539  012776  010146                      4.9  DC.RCV: MOV     R1,-(SP)         ;SAVE REGISTER 1 ON STACK
2540  013000  010246                      4.9          MOV     R2,-(SP)         ;SAVE REGISTER 2 ON STACK
2541  013002  011501                      3.8          MOV     (R5),R1
2542  013004  006301                      2.3          ASL     R1               ;FORM MOD(2) INDEX
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2543  013006  010102                    2.3          MOV     R1,R2           ;DUPLICATE LINE NUMBER
2544  013010  006302                    2.3          ASL     R2              ;FORM MOD10(8) INDEX
2545  013012  006302                    2.3          ASL     R2              ;
2546  013014  062702  174000            3.8          ADD     #174000,R2      ;DEVICE-CSR ADDRESS
2547  013020  005712                    3.2          TST     (R2)            ;ERROR BIT SET?
2548  013022  100001                    2.6          BPL     .+4             ;NO
2549  013024  104000                                 HLT
2550  013026  105712                    3.2          TSTB    (R2)            ;DONE
2551  013030  100401                    2.6          BMI     .+4             ;YES
2552  013032  104000                                 HLT                     ;NO, FALSE INTERRUPT
2553  013034  005722                    3.2          TST     (R2)+           ;INC TO DATA BUFF
2554  013036  121261  013105            5.9          CMPB    (R2),DCDATA+1(R1)       ;TEST DATA
2555  013042  001401                    2.6          BEQ     .+4
2556  013044  104000                                 HLT                     ;FALSE DATA
2557  013046  122761  000037  013105    5.9          CMPB    #37,DCDATA+1(R1)        ;UPPER DATA LIMIT FOR 5 BIT ASCII
2558  013054  001403                    2.6          BEQ     DCRX1           ;YEY
2559  013056  105261  013105            4.9          INCB    DCDATA+1(R1)    ;NO INCREMENT DATA
2560  013062  000403                    2.6          BR      DCRX2
2561  013064  112761  000000  013105    6.4  DCRX1:  MOVB    #0,DCDATA+1(R1) ;REINITIALIZE DATA
2562  013072  052761  000002  001342    6.4  DCRX2:  BIS     #FL.DC,MAP(R1)  ;SET FLAG TO INDICATE LINE SERVISED
2563  013100  000167  005110            4.9          JMP     CLEANUP
2564                                               ;DC11 CSR AND DATA STORAGE
2565
2566
2567  013104                                       DCDATA:
2568  013104  000000                                      0                       ;DC11 DATA, LINE 0
2569  013106  000000                                      0                       ;DC11 DATA, LINE 1
2570  013110  000000                                      0                       ;DC11 DATA, LINE 2
2571  013112  000000                                      0                       ;DC11 DATA, LINE 3
2572  013114  000000                                      0                       ;DC11 DATA, LINE 4
2573  013116  000000                                      0                       ;DC11 DATA, LINE 5
2574  013120  000000                                      0                       ;DC11 DATA, LINE 6
2575  013122  000000                                      0                       ;DC11 DATA, LINE 7
2576  013124  000000                                      0                       ;DC11 DATA, LINE 10
2577  013126  000000                                      0                       ;DC11 DATA, LINE 11
2578  013130  000000                                      0                       ;DC11 DATA, LINE 12
2579  013132  000000                                      0                       ;DC11 DATA, LINE 13
2580  013134  000000                                      0                       ;DC11 DATA, LINE 14
2581  013136  000000                                      0                       ;DC11 DATA, LINE 15
2582  013140  000000                                      0                       ;DC11 DATA, LINE 16
2583  013142  000000                                      0                       ;DC11 DATA, LINE 17
2584  013144  000000                                      0                       ;DC11 DATA, LINE 20
2585  013146  000000                                      0                       ;DC11 DATA, LINE 21
2586  013150  000000                                      0                       ;DC11 DATA, LINE 22
2587  013152  000000                                      0                       ;DC11 DATA, LINE 23
2588  013154  000000                                      0                       ;DC11 DATA, LINE 24
2589  013156  000000                                      0                       ;DC11 DATA, LINE 25
2590  013160  000000                                      0                       ;DC11 DATA, LINE 26
2591  013162  000000                                      0                       ;DC11 DATA, LINE 27
2592  013164  000000                                      0                       ;DC11 DATA, LINE 30
2593  013166  000000                                      0                       ;DC11 DATA, LINE 31
2594  013170  000000                                      0                       ;DC11 DATA, LINE 32
2595  013172  000000                                      0                       ;DC11 DATA, LINE 33
2596  013174  000000                                      0                       ;DC11 DATA, LINE 34
2597  013176  000000                                      0                       ;DC11 DATA, LINE 35
2598  013200  000000                                      0                       ;DC11 DATA, LINE 36
```

```
2599  013202  000000                                    0                       ;DC11 DATA, LINE 37
2600
2601                                          ;KL11 TRANSMITTER (PUNCH) SERVICE ROUTINE
2602
2603          176504                          KLXA=176504                     ;KL11 TRANSMITTER ADDRESS
2604
2605  013204  010146                    4.9   KL.XMT: MOV     R1,-(SP)        ;SAVE REGISTER 1 ON STACK
2606  013206  010246                    4.9           MOV     R2,-(SP)        ;SAVE REGISTER 2 ON STACK
2607  013210  011501                    3.8           MOV     (R5),R1
2608  013212  006301                    2.3           ASL     R1              ;FORM MOD(2) INDEX
2609  013214  010102                    2.3           MOV     R1,R2           ;DUPLICATE LINE NUMBER
2610  013216  006302                    2.3           ASL     R2              ;FORM MOD10(8) INDEX
2611  013220  006302                    2.3           ASL     R2              ;
2612  013222  105762  176504            4.4           TSTB    KLXA(R2)        ;"READY" SET
2613  013226  100401                    2.6           BMI     .+4             ;YES
2614  013230  104000                                  HLT                     ;NO, REPORT ERROR
2615  013232  032762  000100  176504    6.5           BIT     #100,KLXA(R2)   ;INT ENB, INC TO DATA BUFFER
2616  013240  001001                    2.6           BNE     .+4             ;YES
2617  013242  104000                                  HLT                     ;FALSE INT, POSSIBLE CROSS TALK
2618  013244  005722                    3.2           TST     (R2)+           ;INC INDX TO DATA BUFFER
2619  013246  105261  013432            4.9           INCB    KLDATA(R1)      ;INC DATA
2620  013252  122761  000147  013432    5.9           CMPB    #147,KLDATA(R1) ;UPPER LIMIT OF DATA
2621  013260  001003                    2.6           BNE     KLXT            ;NO
2622  013262  112761  000000  013432    6.4           MOVB    #0,KLDATA(R1)   ;REINITIALIZE DATA
2623  013270  116162  013432  176504    7.6   KLXT:   MOVB    KLDATA(R1),KLXA(R2)     ;TRANSMIT DATA
2624  013276  000167  004712            4.9           JMP     CLEANUP
2625
2626                                          ;KL11, RECEIVER SERVICE ROUTINE
2627
2628          176502                          KLRA=176502                     ;KL11 RECEIVER BUFFER ADDRESS
2629
2630  013302  010146                    4.9   KL.RCV: MOV     R1,-(SP)        ;SAVE REGISTER 1 ON STACK
2631  013304  010246                    4.9           MOV     R2,-(SP)        ;SAVE REGISTER 2 ON STACK
2632  013306  011501                    3.8           MOV     (R5),R1
2633  013310  006301                    2.3           ASL     R1              ;FORM MOD(2) INDEX
2634  013312  010102                    2.3           MOV     R1,R2           ;DUPLICATE LINE NUMBER
2635  013314  006302                    2.3           ASL     R2              ;FORM MOD10(8) INDEX
2636  013316  006302                    2.3           ASL     R2              ;
2637  013320  105762  176500            4.4           TSTB    KLRA-2(R2)      ;"DONE" SET
2638  013324  100401                    2.6           BMI     .+4             ;YES
2639  013326  104000                                  HLT
2640  013330  032762  000100  176500    6.5           BIT     #100,KLRA-2(R2) ;INT ENB SET
2641  013336  001001                    2.6           BNE     .+4             ;YES
2642  013340  104000                                  HLT                     ;FALSE INTERRUPT
2643  013342  105762  176502            4.4           TSTB    KLRA(R2)        ;TEST FOR LEADER
2644  013346  001422                    2.6           BEQ     KLR2            ;BRANCH IF LEADER
2645  013350  126261  176502  013433    7.1           CMPB    KLRA(R2),KLDATA+1(R1)   ;NOT LEADER TEST FOR DATA
2646  013356  001405                    2.6           BEQ     KLR3            ;CORRECT DATA
2647  013360  122762  000207  176502    5.9           CMPB    #207,KLRA(R2)   ;BELL
2648  013366  001403                    2.6           BEQ     KLR4            ;YES
2649  013370  104000                                  HLT                     ;NO, REPORT DATA ERROR
2650  013372  105261  013433            4.9   KLR3:   INCB    KLDATA+1(R1)    ;INCREMENT DATA
2651  013376  122761  000147  013433    5.9   KLR4:   CMPB    #147,KLDATA+1(R1)       ;TEST FOR UPPER LIMIT
2652  013404  001003                    2.6           BNE     KLR2
2653  013406  112761  000001  013433    6.4   KLR1:   MOVB    #1,KLDATA+1(R1) ;BASE DATA
2654  013414  005262  176500            4.9   KLR2:   INC     KLRA-2(R2)      ;START READER
```

```
2655  013420  052761  000004  001342     6.4          BIS     #FL.KL,MAP(R1)  ;SET RUN FLAG
2656  013426  000167  004562              4.9          JMP     CLEANUP
2657
2658                                                   ;KL11 TRANSMITTER DATA (BYTES
2659
2660          013432                                   KLXB=KLDATA
2661          013433                                   KLRB=KLDATA+1
2662
2663  013432                                           KLDATA:
2664  013432  000000                                           0                       ;KL11 DATA, LINE 0
2665  013434  000000                                           0                       ;KL11 DATA, LINE 1
2666  013436  000000                                           0                       ;KL11 DATA, LINE 2
2667  013440  000000                                           0                       ;KL11 DATA, LINE 3
2668  013442  000000                                           0                       ;KL11 DATA, LINE 4
2669  013444  000000                                           0                       ;KL11 DATA, LINE 5
2670  013446  000000                                           0                       ;KL11 DATA, LINE 6
2671  013450  000000                                           0                       ;KL11 DATA, LINE 7
2672  013452  000000                                           0                       ;KL11 DATA, LINE 10
2673  013454  000000                                           0                       ;KL11 DATA, LINE 11
2674  013456  000000                                           0                       ;KL11 DATA, LINE 12
2675  013460  000000                                           0                       ;KL11 DATA, LINE 13
2676  013462  000000                                           0                       ;KL11 DATA, LINE 14
2677  013464  000000                                           0                       ;KL11 DATA, LINE 15
2678  013466  000000                                           0                       ;KL11 DATA, LINE 16
2679  013470  000000                                           0                       ;KL11 DATA, LINE 17
2680  013472  000000                                           0                       ;KL11 DATA, LINE 20
2681  013474  000000                                           0                       ;KL11 DATA, LINE 21
2682  013476  000000                                           0                       ;KL11 DATA, LINE 22
2683  013500  000000                                           0                       ;KL11 DATA, LINE 23
2684  013502  000000                                           0                       ;KL11 DATA, LINE 24
2685  013504  000000                                           0                       ;KL11 DATA, LINE 25
2686  013506  000000                                           0                       ;KL11 DATA, LINE 26
2687  013510  000000                                           0                       ;KL11 DATA, LINE 27
2688  013512  000000                                           0                       ;KL11 DATA, LINE 30
2689  013514  000000                                           0                       ;KL11 DATA, LINE 31
2690  013516  000000                                           0                       ;KL11 DATA, LINE 32
2691  013520  000000                                           0                       ;KL11 DATA, LINE 33
2692  013522  000000                                           0                       ;KL11 DATA, LINE 34
2693  013524  000000                                           0                       ;KL11 DATA, LINE 35
2694  013526  000000                                           0                       ;KL11 DATA, LINE 36
2695  013530  000000                                           0                       ;KL11 DATA, LINE 37
2696
2697
2698  013532  010146                          4.9  DP.RCV:  MOV     R1,-(SP)        ;SAVE REGISTER 1 ON STACK
2699  013534  010246                          4.9           MOV     R2,-(SP)        ;SAVE REGISTER 2 ON STACK
2700  013536  011501                          3.8           MOV     (R5),R1
2701  013540  006301                          2.3           ASL     R1              ;FORM MOD(2) INDEX
2702  013542  010102                          2.3           MOV     R1,R2           ;DUPLICATE LINE NUMBER
2703  013544  006302                          2.3           ASL     R2              ;FORM MOD10(8) INDEX
2704  013546  006302                          2.3           ASL     R2              ;
2705  013550  005402                          2.3           NEG     R2
2706  013552  062702  174770                 3.8           ADD     #174770,R2      ;R2=RCV STATUS REG
2707  013556  032712  000200                 5.3           BIT     #BIT7,@R2       ;DONE SET
2708  013562  001001                          2.6           BNE     .+4             ;
2709  013564  104000                                        HLT                     ;REPORT FALSE INTERRUPT
2710
```

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2711  013566  116261  000002  014023  7.6          MOVB    2(R2),DPRCVDATA+1(R1) ;SAVE RCV DATA
2712  013574  126161  014023  014022  7.1          CMPB    DPRCVDATA+1(R1),DPRCVDATA(R1) ;CHECK DATA
2713  013602  001426                  2.6          BEQ     DP.R1                 ;BRANCH IF DATA OK
2714  013604  126167  014023  001241  7.1          CMPB    DPRCVDATA+1(R1),TSYNC+1 ;DATA=SYNC PLUS ONE
2715  013612  001420                  2.6          BEQ     DP.R2                 ;BRANCH IF SYNC
2716  013614  032762  040000  000004  6.5          BIT     #RCVORUN,4(R2)        ;TEST XMT STATUS FOR RCV O'RUN
2717  013622  001001                  2.6          BNE     .+4                   ;DATA CHECK INVALID IF O'RUN
2718                                                                             ;THEREFORE, REMOVE ACTIVE, EXIT
2719  013624  104000                               HLT                           ;REPORT DATA ERROR
2720  013626  105061  014022          4.9          CLRB    DPRCVDATA(R1)         ;ZERO EXPECTED DATA
2721  013632  105061  014122          4.9          CLRB    DPXMTDATA(R1)         ;CLEAR XMIT DATA
2722  013636  042762  160000  000004  7.0          BIC     #160000,4(R2)         ;CLR O'RUN+ERRORS
2723  013644  052762  000010  000004  6.4          BIS     #RESYNC,4(R2)         ;SET RESYNC FLAG
2724  013652  000405                  2.6          BR      DP.R5                 ;EXIT
2725  013654  105261  014022          4.9  DP.R2:  INCB    DPRCVDATA(R1)         ;MAKE UP FOR SYNC STRIP
2726  013660  105261  014022          4.9  DP.R1:  INCB    DPRCVDATA(R1)         ;INC EXPECTED DATA
2727  013664  001002                  2.6          BNE     DP.R4                 ;EXIT
2728  013666  042712  004000          5.8  DP.R5:  BIC     #ACTIVE,@R2           ;CLEAR ACTIVE
2729  013672  052761  000010  001342  6.4  DP.R4:  BIS     #FL.DP,MAP(R1)        ;SET DP RUN FLAG
2730  013700  000167  004310          4.9          JMP     CLEANUP
2731
2732                                               ;DP TRANSMITTER ISR
2733
2734  013704  010146                  4.9  DP.XMT: MOV     R1,-(SP)              ;SAVE REGISTER 1 ON STACK
2735  013706  010246                  4.9          MOV     R2,-(SP)              ;SAVE REGISTER 2 ON STACK
2736  013710  011501                  3.8          MOV     (R5),R1
2737  013712  006301                  2.3          ASL     R1                    ;FORM MOD(2) INDEX
2738  013714  010102                  2.3          MOV     R1,R2                 ;DUPLICATE LINE NUMBER
2739  013716  006302                  2.3          ASL     R2                    ;FORM MOD10(8) INDEX
2740  013720  006302                  2.3          ASL     R2                    ;
2741  013722  005402                  2.3          NEG     R2                    ;DP STATUS REGS ARE DESENDING
2742  013724  062702  174774          3.8          ADD     #174774,R2            ;DP XMT STATUS
2743  013730  105712                  3.2          TSTB    @R2                   ;TEST DONE BIT
2744  013732  100401                  2.6          BMI     .+4                   ;BRANCH IF DONE
2745  013734  104000                               HLT                           ;REPORT ERROR, FALSE INTERRUPT
2746  013736  032712  000010          5.3          BIT     #RESYNC,(R2)          ;TEST FOR RESYNC
2747  013742  001012                  2.6          BNE     DP.X2                 ;BRANCH IF IN SYNC
2748  013744  116162  014122  000002  7.6          MOVB    DPXMTDATA(R1),2(R2) ;TRANSMIT DATA
2749  013752  105261  014122          4.9          INCB    DPXMTDATA(R1)         ;INC TRANSMIT DATA
2750  013756  001017                  2.6          BNE     DP.X3                 ;BRANCH IF NOT DONE
2751  013760  052712  000010          5.2          BIS     #RESYNC,(R2)          ;SET RE-SYNC BITS
2752  013764  000167  004224          4.9          JMP     CLEANUP               ;EXIT
2753  013770  116262  177777  000002  7.6  DP.X2:  MOVB    -1(R2),2(R2)          ;XMIT SYNC CHAR
2754  013776  105361  014123          4.9          DECB    DPXMTDATA+1(R1)       ;DEC SYNC COUNT
2755  014002  001005                  2.6          BNE     DP.X3                 ;EXIT IF SYNC COUNT NOT ZERO
2756  014004  112761  000004  014123  6.4          MOVB    #4,DPXMTDATA+1(R1)      ;REINIT SYNC COUNT
2757  014012  042712  000010          5.8          BIC     #RESYNC,(R2)          ;CLEAR RESYNC FLAG
2758  014016  000167  004172          4.9  DP.X3:  JMP     CLEANUP
2759
2760  014022                                       DPRCVDATA:
2761                                                        ;LOW BYTE FOR EXPECTED DATA, HI BYTE FOR RECIEVED DATA
2762  014022  000000                               0                             ;DP11 RECEVER DATA LINE 0
2763  014024  000000                               0                             ;DP11 RECEVER DATA LINE 1
2764  014026  000000                               0                             ;DP11 RECEVER DATA LINE 2
2765  014030  000000                               0                             ;DP11 RECEVER DATA LINE 3
2766  014032  000000                               0                             ;DP11 RECEVER DATA LINE 4
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2767  014034  000000                    0                    ;DP11 RECEVER DATA LINE 5
2768  014036  000000                    0                    ;DP11 RECEVER DATA LINE 6
2769  014040  000000                    0                    ;DP11 RECEVER DATA LINE 7
2770  014042  000000                    0                    ;DP11 RECEVER DATA LINE 10
2771  014044  000000                    0                    ;DP11 RECEVER DATA LINE 11
2772  014046  000000                    0                    ;DP11 RECEVER DATA LINE 12
2773  014050  000000                    0                    ;DP11 RECEVER DATA LINE 13
2774  014052  000000                    0                    ;DP11 RECEVER DATA LINE 14
2775  014054  000000                    0                    ;DP11 RECEVER DATA LINE 15
2776  014056  000000                    0                    ;DP11 RECEVER DATA LINE 16
2777  014060  000000                    0                    ;DP11 RECEVER DATA LINE 17
2778  014062  000000                    0                    ;DP11 RECEVER DATA LINE 20
2779  014064  000000                    0                    ;DP11 RECEVER DATA LINE 21
2780  014066  000000                    0                    ;DP11 RECEVER DATA LINE 22
2781  014070  000000                    0                    ;DP11 RECEVER DATA LINE 23
2782  014072  000000                    0                    ;DP11 RECEVER DATA LINE 24
2783  014074  000000                    0                    ;DP11 RECEVER DATA LINE 25
2784  014076  000000                    0                    ;DP11 RECEVER DATA LINE 26
2785  014100  000000                    0                    ;DP11 RECEVER DATA LINE 27
2786  014102  000000                    0                    ;DP11 RECEVER DATA LINE 30
2787  014104  000000                    0                    ;DP11 RECEVER DATA LINE 31
2788  014106  000000                    0                    ;DP11 RECEVER DATA LINE 32
2789  014110  000000                    0                    ;DP11 RECEVER DATA LINE 33
2790  014112  000000                    0                    ;DP11 RECEVER DATA LINE 34
2791  014114  000000                    0                    ;DP11 RECEVER DATA LINE 35
2792  014116  000000                    0                    ;DP11 RECEVER DATA LINE 36
2793  014120  000000                    0                    ;DP11 RECEVER DATA LINE 37
2794
2795  014122                    DPXMTDATA:
2796  014122  000000                    0                    ;DP11 TRANSMITTER DATA LINE 0
2797  014124  000000                    0                    ;DP11 TRANSMITTER DATA LINE 1
2798  014126  000000                    0                    ;DP11 TRANSMITTER DATA LINE 2
2799  014130  000000                    0                    ;DP11 TRANSMITTER DATA LINE 3
2800  014132  000000                    0                    ;DP11 TRANSMITTER DATA LINE 4
2801  014134  000000                    0                    ;DP11 TRANSMITTER DATA LINE 5
2802  014136  000000                    0                    ;DP11 TRANSMITTER DATA LINE 6
2803  014140  000000                    0                    ;DP11 TRANSMITTER DATA LINE 7
2804  014142  000000                    0                    ;DP11 TRANSMITTER DATA LINE 10
2805  014144  000000                    0                    ;DP11 TRANSMITTER DATA LINE 11
2806  014146  000000                    0                    ;DP11 TRANSMITTER DATA LINE 12
2807  014150  000000                    0                    ;DP11 TRANSMITTER DATA LINE 13
2808  014152  000000                    0                    ;DP11 TRANSMITTER DATA LINE 14
2809  014154  000000                    0                    ;DP11 TRANSMITTER DATA LINE 15
2810  014156  000000                    0                    ;DP11 TRANSMITTER DATA LINE 16
2811  014160  000000                    0                    ;DP11 TRANSMITTER DATA LINE 17
2812  014162  000000                    0                    ;DP11 TRANSMITTER DATA LINE 20
2813  014164  000000                    0                    ;DP11 TRANSMITTER DATA LINE 21
2814  014156  000000                    0                    ;DP11 TRANSMITTER DATA LINE 22
2815  014170  000000                    0                    ;DP11 TRANSMITTER DATA LINE 23
2816  014172  000000                    0                    ;DP11 TRANSMITTER DATA LINE 24
2817  014174  000000                    0                    ;DP11 TRANSMITTER DATA LINE 25
2818  014176  000000                    0                    ;DP11 TRANSMITTER DATA LINE 26
2819  014200  000000                    0                    ;DP11 TRANSMITTER DATA LINE 27
2820  014202  000000                    0                    ;DP11 TRANSMITTER DATA LINE 30
2821  014204  000000                    0                    ;DP11 TRANSMITTER DATA LINE 31
2822  014206  000000                    0                    ;DP11 TRANSMITTER DATA LINE 32
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2823  014210  000000                                  0                       ;DP11 TRANSMITTER DATA LINE 33
2824  014212  000000                                  0                       ;DP11 TRANSMITTER DATA LINE 34
2825  014214  000000                                  0                       ;DP11 TRANSMITTER DATA LINE 35
2826  014216  000000                                  0                       ;DP11 TRANSMITTER DATA LINE 36
2827  014220  000000                                  0                       ;DP11 TRANSMITTER DATA LINE 37
2828
2829                                        ;DM11 TRANSMITTER ISR
2830                                        ;ONE DM11 REPRESENTS ONE CHANNEL, 16 LINES/CHANNEL
2831
2832
2833  014222  010146                    4.9 DM.XMT: MOV     R1,-(SP)            ;SAVE REGISTER 1 ON STACK
2834  014224  010246                    4.9         MOV     R2,-(SP)            ;SAVE REGISTER 2 ON STACK
2835  014226  011501                    3.8         MOV     (R5),R1
2836  014230  006301                    2.3         ASL     R1                  ;FORM MOD(2) INDEX
2837  014232  010102                    2.3         MOV     R1,R2               ;DUPLICATE LINE NUMBER
2838  014234  006302                    2.3         ASL     R2                  ;FORM MOD10(8) INDEX
2839  014236  006302                    2.3         ASL     R2
2840  014240  062702  175000            3.8         ADD     #175000,R2          ;FORM DEVICE ADRS
2841  014244  032712  060000            5.3         BIT     #60000,@R2          ;TEST FOR O'RUN OR TIMEOUT ERROR
2842  014250  001401                    2.6         BEQ     DM.X1               ;BRANCH IF NO ERRORS
2843  014252  104000                                HLT                         ;REPORT ERRORS
2844  014254  005722                    3.2 DM.X1:  TST     (R2)+               ;TEST "TRANSMITTER READY"
2845                                                                            ;INC TO "BUFFER ACTIVE" REGISTER
2846  014256  100401                    2.6         BMI     DM.X2               ;BRANCH IF READY
2847  014260  104000                                HLT                         ;REPORT FALSE INTERRUPT
2848  014262  016205  000004            5.0 DM.X2:  MOV     4(R2),R5            ;FETCH BASE ADRS
2849  014266  012767  000001  000252    6.4         MOV     #1,     DMARK       ;SET UP LINE POINTER
2850  014274  036712  000246            6.5 DM.X3:  BIT     DMARK,  @R2         ;TEST LINE FOR REACTIVATION
2851  014300  001007                    2.6         BNE     DM.X4               ;BRANCH IF CHANNEL STILL ACTIVE
2852  014302  012715  027234            5.2         MOV     #BINCNT,@R5         ;REINIT BASE ADRS
2853  014306  016165  014612  000040    7.6         MOV     DM.LDAT(R1),40(R5)      ;REINIT WCT
2854  014314  056712  000226            6.4         BIS     DMARK,  @R2         ;ACTIVE LINE
2855
2856  014320  005725                    3.2 DM.X4:  TST     (R5)+               ;INCREMENT DM CORE INDEX TO NEXT LINE
2857  014322  006367  000220            4.9         ASL     DMARK               ;SHIFT LINE POINTER TO NEXT LINE
2858  014326  103362                    2.6         BCC     DM.X3               ;BRANCH UNLESS 16 LINES TESTED
2859  014330  042762  100000  177776    7.0         BIC     #BIT15,-2(R2)       ;CLEAR XMT DONE
2860  014336  000167  003652            4.9         JMP     CLEANUP
2861
2862                                        ;DM11 RECEIVER ISR
2863          017000                        LINE0=17000                         ;TUMBLE TABLE MASK TO DETERMINE LINE#
2864
2865  014342  010146                    4.9 DM.RCV: MOV     R1,-(SP)            ;SAVE REGISTER 1 ON STACK
2866  014344  010246                    4.9         MOV     R2,-(SP)            ;SAVE REGISTER 2 ON STACK
2867  014346  011501                    3.8         MOV     (R5),R1
2868  014350  006301                    2.3         ASL     R1                  ;FORM MOD(2) INDEX
2869  014352  010102                    2.3         MOV     R1,R2               ;DUPLICATE LINE NUMBER
2870  014354  006302                    2.3         ASL     R2                  ;FORM MOD10(8) INDEX
2871  014356  006302                    2.3         ASL     R2
2872  014360  062702  175000            3.8         ADD     #175000,R2          ;FORM DEVICE ADDRESS
2873  014364  105712                    3.2         TSTB    @R2                 ;TEST FOR RCV DONE
2874  014366  100401                    2.6         BMI     DM.R1               ;BRANCH IF DONE
2875  014370  104000                                HLT                         ;REPORT FALSE INTERRUPT
2876  014372  016105  014752            5.0 DM.R1:  MOV     DM.TT(R1),R5        ;FETCH TUMBLE TABLE POINTER
2877  014376  005715                    3.2 DM.R2:  TST     @R5                 ;TEST FOR VALID ENTRY
2878  014400  100401                    2.6         BMI     DM.R3               ;BRANCH IF VALID ENTRY
```

```
014402  104000                             HLT                               ;REPORT INVALID ENTRY
014404  011561  014552          6.4  DM.R3: MOV     @R5,TTDAT(R1)            ;TEST FOR MORE ENTRIES
                                                                             ;SAVE TT DATA
014410  100045                  2.6         BPL     DM.R5                    ;EXIT IF NO MORE ENTRIES
014412  142761  000341  014553  7.0         BICB    #341,TTDAT+1(R1)         ;MASK NON LINE # BITS
014420  001024                  2.6         BNE     DM.R4                    ;BRANCH IF NOT LINE 0
                                     ;*****************************************************
014422  121561  015012          5.9  DM.R6: CMPB    @R5,DM.RDAT(R1)          ;COMPARE RCV DATA WITH EXPECTED
014426  001401                  2.6         BEQ     .+4                      ;BRANCH IF DATA OK
                                     ;*********************************************************
014430  104000                             HLT                               ;REPORT DATA ERROR LINE 0
014432  005161  014612          4.9         COM     DM.LDAT(R1)              ;
014436  026161  014612  015012  7.1         CMP     DM.LDAT(R1),DM.RDAT(R1)  ;TEST FOR DATA LIMIT
014444  001006                  2.6         BNE     DM.R7                    ;BRANCH IF NOT END OF DATA
014446  012761  000000  015012  6.4         MOV     #0,DM.RDAT(R1)           ;REINITILIZE DATA
014454  005161  014612          4.9         COM     DM.LDAT(R1)              ;
014460  000404                  2.6         BR      DM.R4
014462  005161  014612          4.9  DM.R7: COM     DM.LDAT(R1)              ;
014466  005261  015012          4.9         INC     DM.RDAT(R1)              ;INCREMENT EXPECTED DATA
014472  005025                  3.7  DM.R4: CLR     (R5)+                    ;CLEAR TT ENTRY
014474  016267  000006  000046  7.6         MOV     6(R2),DM.R8              ;SAVE BASE ADRS
014502  062767  000400  000040  6.4         ADD     #400,DM.R8               ;END OF TT
014510  020567  000034          4.4         CMP     R5,DM.R8                 ;TEST FOR END OF TT
014514  001333                  2.6         BNE     DM.R3                    ;BRANCH IF NOT END
014516  162705  000200          3.8         SUB     #200,R5                  ;POINT R5 TO BOTTOM OF TT
014522  000730                  2.6         BR      DM.R3                    ;CONTINUE TO EXAMINE TT
014524  010561  014752          4.9  DM.R5: MOV     R5,DM.TT(R1)             ;STORE TT POINTER
014530  052761  000020  001342  6.4         BIS     #FL.DMA,MAP(R1)          ;SET RUN FLAG
014536  042712  000200          5.8         BIC     #BIT7,@R2                ;CLEAR DONE
014542  000167  003446          4.9         JMP     CLEANUP


014546  000000                       DMARK:  0                               ;SCRATCH PAD FOR LINE #
014550  000000                       DM.R8:  0                               ;SCRATCH PAD
014552                               TTDAT:                                  ;SAVED TT DATA
014552  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 0
014554  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 1
014556  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 2
014560  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 3
014562  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 4
014564  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 5
014566  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 6
014570  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 7
014572  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 10
014574  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 11
014576  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 12
014600  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 13
014602  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 14
014604  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 15
014606  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 16
014610  000000                               0                               ;DM11 TUMBLE TABLE DATA, CHANNEL 17

014612                               DM.LDAT:                                ;DATA LIMITS FOR EACH CHANNEL
014612  000000                               0                               ;DM11 DATA LIMIT, CHANNEL 0
014614  000000                               0                               ;DM11 DATA LIMIT, CHANNEL 1
014616  000000                               0                               ;DM11 DATA LIMIT, CHANNEL 2
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2935  014620  000000                          0          ;DM11 DATA LIMIT, CHANNEL 3
2936  014622  000000                          0          ;DM11 DATA LIMIT, CHANNEL 4
2937  014624  000000                          0          ;DM11 DATA LIMIT, CHANNEL 5
2938  014626  000000                          0          ;DM11 DATA LIMIT, CHANNEL 6
2939  014630  000000                          0          ;DM11 DATA LIMIT, CHANNEL 7
2940  014632  000000                          0          ;DM11 DATA LIMIT, CHANNEL 10
2941  014634  000000                          0          ;DM11 DATA LIMIT, CHANNEL 11
2942  014636  000000                          0          ;DM11 DATA LIMIT, CHANNEL 12
2943  014640  000000                          0          ;DM11 DATA LIMIT, CHANNEL 13
2944  014642  000000                          0          ;DM11 DATA LIMIT, CHANNEL 14
2945  014644  000000                          0          ;DM11 DATA LIMIT, CHANNEL 15
2946  014646  000000                          0          ;DM11 DATA LIMIT, CHANNEL 16
2947  014650  000000                          0          ;DM11 DATA LIMIT, CHANNEL 17
2948
2949  014652                        DM.CAT:              ;CURRENT ADDRESS TABLE (CAT) ADDRESS TABLE
2950  014652  000000                          0          ;DM11 CAT ADR, CHANNEL 0
2951  014654  000000                          0          ;DM11 CAT ADR, CHANNEL 1
2952  014656  000000                          0          ;DM11 CAT ADR, CHANNEL 2
2953  014660  000000                          0          ;DM11 CAT ADR, CHANNEL 3
2954  014662  000000                          0          ;DM11 CAT ADR, CHANNEL 4
2955  014664  000000                          0          ;DM11 CAT ADR, CHANNEL 5
2956  014666  000000                          0          ;DM11 CAT ADR, CHANNEL 6
2957  014670  000000                          0          ;DM11 CAT ADR, CHANNEL 7
2958  014672  000000                          0          ;DM11 CAT ADR, CHANNEL 10
2959  014674  000000                          0          ;DM11 CAT ADR, CHANNEL 11
2960  014676  000000                          0          ;DM11 CAT ADR, CHANNEL 12
2961  014700  000000                          0          ;DM11 CAT ADR, CHANNEL 13
2962  014702  000000                          0          ;DM11 CAT ADR, CHANNEL 14
2963  014704  000000                          0          ;DM11 CAT ADR, CHANNEL 15
2964  014706  000000                          0          ;DM11 CAT ADR, CHANNEL 16
2965  014710  000000                          0          ;DM11 CAT ADR, CHANNEL 17
2966
2967  014712                        DM.WCT:              ;ADRS OF WORD COUNT (BYTES)
2968  014712  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 0
2969  014714  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 1
2970  014716  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 2
2971  014720  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 3
2972  014722  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 4
2973  014724  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 5
2974  014726  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 6
2975  014730  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 7
2976  014732  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 10
2977  014734  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 11
2978  014736  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 12
2979  014740  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 13
2980  014742  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 14
2981  014744  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 15
2982  014746  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 16
2983  014750  000000                          0          ;DM11 WORD COUNT POINTER, CHANNEL 17
2984
2985  014752                        DM.TT:               ;TUMBLE TABLE POINTERS
2986  014752  000000                          0          ;DM11 TUMBLE TABLE POINTER, CHANNEL 0
2987  014754  000000                          0          ;DM11 TUMBLE TABLE POINTER, CHANNEL 1
2988  014756  000000                          0          ;DM11 TUMBLE TABLE POINTER, CHANNEL 2
2989  014760  000000                          0          ;DM11 TUMBLE TABLE POINTER, CHANNEL 3
2990  014762  000000                          0          ;DM11 TUMBLE TABLE POINTER, CHANNEL 4
```

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2991  014764  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 5
2992  014766  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 6
2993  014770  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 7
2994  014772  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 10
2995  014774  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 11
2996  014776  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 12
2997  015000  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 13
2998  015002  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 14
2999  015004  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 15
3000  015006  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 16
3001  015010  000000                                    0                       ;DM11 TUMBLE TABLE POINTER, CHANNEL 17
3002
3003  015012                                    DM.RDAT:                        ;DM RCV DATA
3004  015012  000000                                    0                       ;CHANNEL 0
3005  015014  000000                                    0                       ;CHANNEL 1
3006  015016  000000                                    0                       ;CHANNEL 2
3007  015020  000000                                    0                       ;CHANNEL 3
3008  015022  000000                                    0                       ;CHANNEL 4
3009  015024  000000                                    0                       ;CHANNEL 5
3010  015026  000000                                    0                       ;CHANNEL 6
3011  015030  000000                                    0                       ;CHANNEL 7
3012  015032  000000                                    0                       ;CHANNEL 8
3013  015034  000000                                    0                       ;CHANNEL 9
3014  015036  000000                                    0                       ;CHANNEL 10
3015  015040  000000                                    0                       ;CHANNEL 11
3016  015042  000000                                    0                       ;CHANNEL 12
3017  015044  000000                                    0                       ;CHANNEL 13
3018  015046  000000                                    0                       ;CHANNEL 14
3019  015050  000000                                    0                       ;CHANNEL 15
3020
3021          104400                            STALL=TRAP
3022          040000                            RCVORUN=40000
3023          004000                            ACTIVE=4000
3024          000010                            RESYNC=10               ;RESYNC FLAG IS BIT2 IN THE SYNC BUFFER
3025
3026  015052  013426                            TSYNC:  13426           ;TSYNC=26,TSYNC+1=27
3027                                                                    ;IF SYNC CHAR IS CHANGED MAKE SURE RESYNC FITS
3028
3029                                            ;DN11 INTERUPT SERVICE ROUTINE
3030
3031  015054  010146                    4.9     DN.ISR: MOV     R1,-(SP)        ;SAVE REGISTER 1 ON STACK
3032  015056  010246                    4.9             MOV     R2,-(SP)        ;SAVE REGISTER 2 ON STACK
3033  015060  011501                    3.8             MOV     (R5),R1
3034  015062  006301                    2.3             ASL     R1              ;FORM MOD(2) INDEX
3035  015064  052761  000040  001342    6.4             BIS     #FL.DN,MAP(R1)
3036  015072  006301                    2.3             ASL     R1              ;FORM MOD(4) INDEX
3037  015074  010102                    2.3             MOV     R1,R2           ;DUPLICATE LINE NUMBER
3038  015076  006302                    2.3             ASL     R2              ;FORM MOD10(8) INDEX
3039  015100  066702  005704            5.0             ADD     DNADRS, %2      ;CALCULATE DN11 CSR ADDDRESS
3040  015104  005067  000256            4.9             CLR     DNIFLG          ;CLR INTERUPT SERVICE FLAG
3041  015110  042712  000004            5.8             BIC     #BIT2,  (2)     ;MASTER INTERUPT DISABLE
3042  015114  105712                    3.2     DN.I1:  TSTB    (2)             ;CHECK DONE
3043  015116  100033                    2.6             BPL     DN.I2           ;BRANCH IF NOT DONE
3044  015120  116105  015242            5.0             MOVB    DNDATA(1),%5    ;GET DATA POINTER
3045  015124  100007                    2.6             BPL     1$              ;BRANCH IF POINTER IS IN RIGHT STATE
3046  015126  011203                    3.8             MOV     (2),    R3      ;ACTUAL DATA
```

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3047  015130  010304                    2.3          MOV     R3,     R4      ;SET UP " SHOULD BE"
3048  015132  142704  000200            4.4          BICB    #BIT7,  R4      ;CLEAR "DONE"
3049  015136  006201                    2.3          ASR     R1              ;FROM
3050  015140  006201                    2.3          ASR     R1              ;UNIT #
3051  015142  104004                                 HLT+4                   ;DN11 "DONE" SET WHEN IT SHOULDN'T HAVE
3052
3053  015144  026512  015354            5.9  1$:     CMP     DNRCVD(5),(2)   ;CHECK DATA
3054  015150  001401                    2.6          BEQ     2$              ;BRANCH IF OK
3055  015152  104000                                 HLT                     ;DN11 ERROR (ADRS OF LINE CSR IN R2)
3056
3057  015154  005012                    3.7  2$:     CLR     (2)             ;CLR DN11 STATUS REGISTER
3058  015156  005725                    3.2          TST     (5)+            ;UPDATE POINTER OFFSET
3059  015160  022705  000010            3.8          CMP     #10,    %5      ;CHECK FOR END OF DATA TABLE
3060  015164  002001                    2.6          BGE     .+4
3061  015166  005005                    2.3          CLR     %5
3062  015170  005105                    2.3          COM     %5
3063  015172  110561  015242            4.9          MOVB    %5,DNDATA(1)
3064  015176  012712  000011            5.2          MOV     #11,    (2)     ;SET MAINT, FCRQ
3065  015202  005267  000160            4.9          INC     DNIFLG          ;"SET" INTERUPT SERVICED FLAG
3066  015206  005722                    3.2  DN.I2:  TST     (2)+
3067  015210  005201                    2.3          INC     %1
3068  015212  032702  000007            4.4          BIT     #7,     %2      ;CHECK FOR LAST LINE
3069  015216  001336                    2.6          BNE     DN.I1
3070  015220  005767  000142            4.4          TST     DNIFLG          ;CHECK FOR INTERUPT SERVICED
3071  015224  001001                    2.6          BNE     .+4             ;BRANCH IF IT WAS
3072  015226  104000                                 HLT                     ;DN11 FALSE INTERUPT
3073
3074  015230  052762  000004  177770    6.4          BIS     #BIT2,  -10(2)  ;MASTER INTERUPT ENABLE
3075  015236  000167  002752            4.9          JMP     CLEANUP
3076
3077  015242                                   DNDATA:                         ;DATA TABLE POINTER TABLE
3078  015242      000                                  .BYTE   0               ;DN11 DATA, LINE 0
3079  015243      000                                  .BYTE   0               ;DN11 DATA, LINE 1
3080  015244      000                                  .BYTE   0               ;DN11 DATA, LINE 2
3081  015245      000                                  .BYTE   0               ;DN11 DATA, LINE 3
3082  015246      000                                  .BYTE   0               ;DN11 DATA, LINE 4
3083  015247      000                                  .BYTE   0               ;DN11 DATA, LINE 5
3084  015250      000                                  .BYTE   0               ;DN11 DATA, LINE 6
3085  015251      000                                  .BYTE   0               ;DN11 DATA, LINE 7
3086  015252      000                                  .BYTE   0               ;DN11 DATA, LINE 10
3087  015253      000                                  .BYTE   0               ;DN11 DATA, LINE 11
3088  015254      000                                  .BYTE   0               ;DN11 DATA, LINE 12
3089  015255      000                                  .BYTE   0               ;DN11 DATA, LINE 13
3090  015256      000                                  .BYTE   0               ;DN11 DATA, LINE 14
3091  015257      000                                  .BYTE   0               ;DN11 DATA, LINE 15
3092  015260      000                                  .BYTE   0               ;DN11 DATA, LINE 16
3093  015261      000                                  .BYTE   0               ;DN11 DATA, LINE 17
3094  015262      000                                  .BYTE   0               ;DN11 DATA, LINE 20
3095  015263      000                                  .BYTE   0               ;DN11 DATA, LINE 21
3096  015264      000                                  .BYTE   0               ;DN11 DATA, LINE 22
3097  015265      000                                  .BYTE   0               ;DN11 DATA, LINE 23
3098  015266      000                                  .BYTE   0               ;DN11 DATA, LINE 24
3099  015267      000                                  .BYTE   0               ;DN11 DATA, LINE 25
3100  015270      000                                  .BYTE   0               ;DN11 DATA, LINE 26
3101  015271      000                                  .BYTE   0               ;DN11 DATA, LINE 27
3102  015272      000                                  .BYTE   0               ;DN11 DATA, LINE 30
```

```
3103  015273  000                    .BYTE   0               ;DN11 DATA, LINE 31
3104  015274  000                    .BYTE   0               ;DN11 DATA, LINE 32
3105  015275  000                    .BYTE   0               ;DN11 DATA, LINE 33
3106  015276  000                    .BYTE   0               ;DN11 DATA, LINE 34
3107  015277  000                    .BYTE   0               ;DN11 DATA, LINE 35
3108  015300  000                    .BYTE   0               ;DN11 DATA, LINE 36
3109  015301  000                    .BYTE   0               ;DN11 DATA, LINE 37
3110  015302  000                    .BYTE   0               ;DN11 DATA, LINE 40
3111  015303  000                    .BYTE   0               ;DN11 DATA, LINE 41
3112  015304  000                    .BYTE   0               ;DN11 DATA, LINE 42
3113  015305  000                    .BYTE   0               ;DN11 DATA, LINE 43
3114  015306  000                    .BYTE   0               ;DN11 DATA, LINE 44
3115  015307  000                    .BYTE   0               ;DN11 DATA, LINE 45
3116  015310  000                    .BYTE   0               ;DN11 DATA, LINE 46
3117  015311  000                    .BYTE   0               ;DN11 DATA, LINE 47
3118  015312  000                    .BYTE   0               ;DN11 DATA, LINE 50
3119  015313  000                    .BYTE   0               ;DN11 DATA, LINE 51
3120  015314  000                    .BYTE   0               ;DN11 DATA, LINE 52
3121  015315  000                    .BYTE   0               ;DN11 DATA, LINE 53
3122  015316  000                    .BYTE   0               ;DN11 DATA, LINE 54
3123  015317  000                    .BYTE   0               ;DN11 DATA, LINE 55
3124  015320  000                    .BYTE   0               ;DN11 DATA, LINE 56
3125  015321  000                    .BYTE   0               ;DN11 DATA, LINE 57
3126  015322  000                    .BYTE   0               ;DN11 DATA, LINE 60
3127  015323  000                    .BYTE   0               ;DN11 DATA, LINE 61
3128  015324  000                    .BYTE   0               ;DN11 DATA, LINE 62
3129  015325  000                    .BYTE   0               ;DN11 DATA, LINE 63
3130  015326  000                    .BYTE   0               ;DN11 DATA, LINE 64
3131  015327  000                    .BYTE   0               ;DN11 DATA, LINE 65
3132  015330  000                    .BYTE   0               ;DN11 DATA, LINE 66
3133  015331  000                    .BYTE   0               ;DN11 DATA, LINE 67
3134  015332  000                    .BYTE   0               ;DN11 DATA, LINE 70
3135  015333  000                    .BYTE   0               ;DN11 DATA, LINE 71
3136  015334  000                    .BYTE   0               ;DN11 DATA, LINE 72
3137  015335  000                    .BYTE   0               ;DN11 DATA, LINE 73
3138  015336  000                    .BYTE   0               ;DN11 DATA, LINE 74
3139  015337  000                    .BYTE   0               ;DN11 DATA, LINE 75
3140  015340  000                    .BYTE   0               ;DN11 DATA, LINE 76
3141  015341  000                    .BYTE   0               ;DN11 DATA, LINE 77
3142
3143  015342  000500          DNXMTD: 000500
3144  015344  001100                  001100
3145  015346  002100                  002100
3146  015350  004100                  004100
3147  015352  007500                  007500
3148
3149  015354  010731          DNRCVD: 010731
3150  015356  011351                  011351
3151  015360  112311                  112311
3152  015362  054311                  054311
3153  015364  157771                  157771
3154
3155  015366  000000          DNIFLG: 0                       ;DN11 INTERUPT SERVICE FLAG
3156
3157                                  ;ENTER HERE ON DM11 -BB INTERRUPT
3158
```

```
 3159  015370  010146                        4.9  DMBISR: MOV     R1,      -(SP)    ;SAVE R1
 3160  015372  010246                        4.9          MOV     R2,      -(SP)    ;SAVE R2
 3161  015374  011501                        3.8          MOV     (R5),    R1       ;GET UNIT NUMBER
 3162  015376  006301                        2.3          ASL     R1                ;*2
 3163  015400  010102                        2.3          MOV     R1,      R2       ;ALSO IN R2
 3164  015402  006302                        2.3          ASL     R2                ;*4
 3165  015404  006302                        2.3          ASL     R2                ;*10
 3166  015406  063702  001612                3.8          ADD     @#AD.DMB,R2       ;SET UP DM11BB CSR ADDRESS
 3167  015412  105712                        3.2          TSTB    (R2)              ;IS DONE BIT SET
 3168  015414  100401                        2.6          BMI     .+4
 3169  015416  104000                                     HLT                       ;INTERRUPT WITH DONE NOT SE
 3170  015420  052761  000100  001342        6.4          BIS     #FL.DMB,MAP(R1)
 3171  015426  000167  002562                4.9          JMP     CLEANUP
 3172
 3173
 3174                                                ; DX11 DEFINITIONS
 3175
 3176          000010                            CE=10
 3177          000004                            DE=4
 3178          000400                            TIOC=400                  ;TEST I/O
 3179          000001                            WRITEC=001                ;WRITE
 3180          000002                            READC=002                 ;READ
 3181          000403                            NOPC=403                  ;NOP
 3182          000004                            SENSEC=4                  ;SENSE
 3183          000405                            ILLC=405                  ;ILLEGAL COMMAND
 3184          000002                            UC=2
 3185
 3186          000010                            DEVNUM=8.
 3187  015432  000010                            MAX.DEV.CU:     DEVNUM
 3188
 3189  015434  000002                            ERRDST: UC
 3190
 3191                                            ;OFFLINE INTERRUPT SERVICE ROUTINE
 3192
 3193                                            ;DUMMY DX INTERRUPT SERVICE ROUTINE
 3194
 3195  015436  104000                            DMY.ISR:        HLT                       ;FALSE DX INTERRUPT CHECK M7821
 3196  015440  000002                        4.8          RTI
 3197
 3198
 3199  015442  010146                        4.9  DX.ISR: MOV     %1,      -(6)     ;SAVE REGISTERS
 3200  015444  010246                        4.9          MOV     %2,      -(6)
 3201  015446  016701  171004                5.0          MOV     DXDAT,   %1
 3202  015452  012702  000200                3.8          MOV     #128.,   %2
 3203  015456  022711  052525                4.7  DXDCK:  CMP     #52525,  (1)      ;CHECK DATA (TWO BYTES)
 3204  015462  001404                        2.6          BEQ     DXDTE             ;BRANCH IF OK
 3205  015464  122741  000125                5.9          CMPB    #125,    -(1)     ;RESTORE DISPLAY VALUE
 3206  015470  104002                                     HLT+2
 3207  015472  000416                        2.6          BR      DXOUT
 3208  015474  005021                        3.7  DXDTE:  CLR     (1)+              ;CLEAR CURRENT AND INCREMENT TO NEXT (TW
 3209  015476  005302                        2.3          DEC     %2
 3210  015500  001366                        2.6          BNE     DXDCK
 3211  015502  042777  000004  001712        8.2          BIC     #4,@DXES          ;CLEAR SOSIEN
 3212  015510  042777  000200  001664        8.2          BIC     #200,@DXCS        ;CLEAR DONE
 3213  015516  004767  000032                7.0          JSR     %7,      DXGO     ;START NEXT NPR
 3214  015522  052767  000400  163612        6.4          BIS     #FL.DX,MAP
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3215  015530  000137  020214            3.7  DXOUT.  JMP     @#CLEANUP
3216
3217
3218  015534  016701  170716            5.0  CLRDXD: MOV     DXDAT,R1
3219  015540  012702  000400            3.8          MOV     #256.,R2
3220  015544  105021                    3.7  DS.3:   CLRB    (R1)+
3221  015546  005302                    2.3          DEC     R2
3222  015550  001375                    2.6          BNE     DS.3
3223  015552  000207                    3.5          RTS     PC
3224
3225  015554  016777  170676  001624    8.8  DXGO:   MOV     DXDAT,@DXBA             ;SET UP BASE ADRS REG
3226  015562  012777  177400  001620    7.6          MOV     #-256.,@DXBC            ;SET DXBC
3227  015570  052777  000003  001604    7.6          BIS     #3,@DXCS                ;SET GO
3228  015576  052777  060000  001606    7.6          BIS     #60000,@DXMO            ;CUI - SEL0, HLD0
3229  015604  042777  060000  001600    8.2          BIC     #60000,@DXMO
3230  015612  052777  002000  001572    7.6          BIS     #2000,@DXMO             ;CMD0
3231  015620  042777  002000  001564    8.2          BIC     #2000,@DXMO             ;
3232
3233  015626  052777  000004  001566    7.6          BIS     #4,@DXES                ;SOSIEN FOR FAST NPR
3234  015634  000207                    3.5          RTS     %7
3235
3236
3237                                     ;INTRRUPT SERVICE ROUTINE FOR ONLINE OPERATION
3238                                     .REM    *
3239                                     DCT=%0                                  ;CURRENT DCT BASE (BACKGROUND TASK)
3240                                     TTP=%1                                  ;CURRENT TUMBLE TABLE POINTER (INTERRUPT
3241                                     T1=%2                                   ;WORK REGISTER (BACKGROUND)
3242                                     T2=%3                                   ;WORK REGISTER (BACKGROUND)
3243                                     T3=%4                                   ;WORK REGISTER (BACKGROUND)
3244                                     W=%5                                    ;DCT BASE (INTERRUPT)
3245                                             *
3246                                     ;NOTE:
3247                                     ;       NO ERRORS ARE DETECTED BY CTP FOR ONLINE OPERATION
3248                                     ;       AND THE DX IS NOT MONITORED FOR DEVICE ACTIVITY (RUNNING).
3249
3250
3251  015636  052767  000400  163476    6.4  DXOL.ISR:BIS    #FL.DX,MAP
3252  015644  010527                    3.7          MOV     %5,(PC)+
3253  015646  000000                         R5S:    0
3254  015650  010427                    3.7          MOV     %4,(PC)+
3255  015652  000000                         R4S:    0
3256  015654  010327                    3.7          MOV     %3,(PC)+
3257  015656  000000                         R3S:    0
3258  015660  010227                    3.7          MOV     %2,(PC)+
3259  015662  000000                         R2S:    0
3260  015664  010127                    3.7          MOV     %1,(PC)+
3261  015666  000000                         R1S:    0
3262  015670  010027                    3.7          MOV     %0,(PC)+
3263  015672  000000                         R0S:    0
3264  015674  016701  000326            5.0  RETRY:  MOV     SAVTTP,TTP              ;RESTORE TTP
3265  015700  042777  000200  001474    8.2          BIC     #DONE,@DXCS             ;CLEAR LOCK
3266  015706  011161  001000            6.4          MOV     (TTP),  1000(TTP)       ;TRACE T/T
3267  015712  016161  000002  001002    7.6          MOV     2(TTP), 1002(TTP)
3268  015720  032711  010000            5.3          BIT     #SYSRST,@TTP            ;SYSTEM RESET?
3269  015724  001404                    2.6          BEQ     INT1                    ;NO
3270  015726  042777  000400  001446    8.2          BIC     #CUBSY,@DXCS
```

```
3271  015734  000466                    2.6          BR      INTOUT
3272
3273  015736  147761  000266  000002    9.4  INT1:   BICB    @CU,CUART(TTP)  ;CLEAR CU OUT OF DXCA
3274  015744  116105  000002            5.0          MOVB    CUART(TTP),W
3275  015750  006305                    2.3          ASL     W
3276  015752  016505  017632            5.0          MOV     DCTP(W),W
3277
3278  015756  005767  000250            4.4          TST     WAIT                    ;PREVIOUS REQUEST?
3279  015762  001412                    2.6          BEQ     INT2                    ;NO
3280
3281  015764  010546                    4.9          MOV     W,      -(SP)           ;NO - REQUEUE IT
3282  015766  116705  000216            5.0          MOVB    DEV,    W
3283  015772  006305                    2.3          ASL     W
3284  015774  016505  017632            5.0          MOV     DCTP(W),W
3285  016000  016565  000002  000000    7.6          MOV     LREQ(W),REQ(W)
3286  016006  012605                    3.8          MOV     (SP)+,  W               ;BACK TO CURRENT DEV
3287
3288  016010  005067  000216            4.9  INT2:   CLR     WAIT                    ;CLEAR WAIT FLAG
```

```
3289  016014  005711                  3.2         TST     (TTP)                   ;ANY ENTRY?
3290  016016  001447                  2.6         BEQ     CLEAN                   ;NO - CLEAN UP
3291
3292  016020  032711  004000          5.3         BIT     #INFDSC,(TTP)           ;CHECK FOR HIC
```

```
3293  016024  001404                    2.6          BEQ     DS1
3294  016026  004767  000772            7.0          JSR     PC,     DXDSC
3295  016032  000167  000054            4.9          JMP     INTOUT
3296  016036  032711  000102            5.3  DS1:    BIT     #ESEND!STKSTB,(TTP)     ;CHECK FOR ES END
3297  016042  001404                    2.6          BEQ     DS2
3298  016044  004767  000630            7.0          JSR     PC,     ESDONE
3299  016050  000167  000036            4.9          JMP     INTOUT
3300  016054  032711  000200            5.3  DS2:    BIT     #CHIS,  (TTP)           ;CHECK FOR ISS
3301  016060  001404                    2.6          BEQ     DS3
3302  016062  004767  001044            7.0          JSR     PC,     DXISS
3303  016066  000167  000020            4.9          JMP     INTOUT
3304  016072  032711  000060            5.3  DS3:    BIT     #CUDEND!CHDEND,(TTP)    ;CHECK FOR DT END
3305  016076  001404                    2.6          BEQ     DS4
3306  016100  004767  000530            7.0          JSR     PC,     DTDONE
3307  016104  000167  000002            4.9          JMP     INTOUT
3308
3309  016110  000240                    1.5  DS4:    NOP                             ;UNRECOGNIZED T/T ENTRY
3310
3311  016112                                INTOUT:
3312  016112  005011                    3.7          CLR     @TTP                    ;CLEAR THIS ENTRY
3313  016114  062701  000004            3.8          ADD     #4,     TTP             ;SET FOR NEXT
3314  016120  020167  170326            4.4          CMP     TTP,TTTT                ;END OF TT
3315  016124  002665                    2.6          BLT     RETRY                   ;NO - OK
3316  016126  016701  170316            5.0          MOV     TT,TTP                  ;YES - START OVER
3317  016132  000167  177542            4.9          JMP     RETRY                   ;
3318
3319                                    ;EXIT FROM INTERRUPT
3320
3321
3322                                    .SBTTL          DX11 BACKGROUND TASK
3323                                    ;DX BACKGROUND TASK
3324                                    ;POLL REQUEST LOOP
3325                                    .REM    *
3326                                    DCT=%0                                  ;CURRENT DCT BASE (BACKGROUND TASK)
3327                                    TTP=%1                                  ;CURRENT TUMBLE TABLE POINTER (INTERRUPT
3328                                    T1=%2                                   ;WORK REGISTER (BACKGROUND)
3329                                    T2=%3                                   ;WORK REGISTER (BACKGROUND)
3330                                    T3=%4                                   ;WORK REGISTER (BACKGROUND)
3331                                    W=%5                                    ;DCT BASE (INTERRUPT)
3332                                            *
3333  016136  005067  000046            4.9  CLEAN:  CLR     DEV                     ;DO ALL POSSIBLE DEVICES
3334  016142  016702  000042            5.0  LOOP:   MOV     DEV,    T1              ;GET DEVICE TO TEST
3335  016146  006302                    2.3          ASL     T1                      ;WORD INDEX
3336  016150  016200  017632            5.0          MOV     DCTP(T1),DCT            ;SET UP DCT
3337  016154  016002  000000            5.0          MOV     REQ(DCT),T1             ;GET REQUEST CODE
3338  016160  006302                    2.3          ASL     T1                      ;WORD INDEX
3339  016162  004772  016212            8.2          JSR     PC,     @REQTBL(T1)     ;DISPATCH TO HANDLER
3340
3341  016166  005267  000016            4.9          INC     DEV                     ;TO NEXT DEVICE
3342  016172  046767  170552  000010    8.2          BIC     NUMDEV,DEV              ;MASK TO DESIRED LEVEL
3343  016200  005767  000004            4.4          TST     DEV                     ;ALL DONE?
3344  016204  001356                    2.6          BNE     LOOP                    ; NO
3345  016206  000572                    2.6  DXLP:   BR      SS4                     ;EXIT
3346  016210  000000                         DEV:    0                               ;CURRENT POLL
3347
3348  016212  016234                         REQTBL: SNULL
```

```
 3349  016214  016236                                  SINPUT
 3350  016216  016336                                  SOUTPT
 3351  016220  016436                                  SSTAT
 3352  016222  016522                                  SSCUE
 3353                                          ;MODE CONTROL
 3354  016224  177777                         MODE:    -1                    ;0 FOR 2703. -1 FOR 2848
 3355  016226  000000                         SAVTTP:  0                     ;SAVED TT POINTER
```

```
3356  016230  017430                              CU:     DXLEGA                  ;LOW ORDER DEVICE ADDRESS
3357
3358                                              ;CONTROL UNIT STATUS
3359
3360  016232  000000                              WAIT:   0                               ;CU STATE -
3361
3362          000000                              CUIDL=0                                 ;IDLE CU
3363          000001                              CUES=1                                  ;STATUS END EXPECTED
3364          000002                              CUDT=2                                  ;DT END EXPECTED
3365
3366  016234  000207                      3.5     SNULL:  RTS     PC                      ;NULL ENTRY
3367
3368  016236  005060  000000              4.9     SINPUT: CLR     REQ(DCT)                ;CLEAR REQUEST
3369  016242  026027  000004  000001      5.9             CMP     DEVSTA(DCT),#DATA
3370  016250  001031                      2.6             BNE     ST1
3371  016252  012767  000002  177752      6.4             MOV     #CUDT,  WAIT            ;SET WAIT STATE
3372  016260  116777  177724  001112      8.8             MOVB    DEV,    @DXCA           ;SET DEV
3373  016266  157777  177736  001104     10.0             BISB    @CU,    @DXCA
3374  016274  016077  000012  001104      8.8             MOV     BUFA(DCT),@DXBA         ;SET UP BUF ADDR
3375  016302  012777  177774  001100      7.6             MOV     #-4,    @DXBC
3376  016310  026027  000014  177774      5.9             CMP     BUFC(DCT),#-4
3377  016316  003403                      2.6             BLE     .+10
```

```
3378  016320  016077  000014  001062     8.8          MOV     BUFC(DCT),@DXBC
3379  016326  052777  000003  001046     7.6          BIS     #FCTNR, @DXCS           ;SET FUNCTION
3380  016334  000207                     3.5  ST1:    RTS     PC                      ;DONE
3381
3382  016336  005060  000000             4.9  SOUTPT: CLR     REQ(DCT)
3383  016342  026027  000004  000001     5.9          CMP     DEVSTA(DCT),#DATA
3384  016350  001031                     2.6          BNE     S01
3385  016352  012767  000002  177652     6.4          MOV     #CUDT,  WAIT
3386  016360  116777  177624  001012     8.8          MOVB    DEV,    @DXCA           ;SET DEV
3387  016366  157777  177636  001004    10.0          BISB    @CU,    @DXCA
3388  016374  016077  000012  001004     8.8          MOV     BUFA(DCT),@DXBA
3389  016402  012777  177774  001000     7.6          MOV     #-4,@DXBC
3390  016410  026027  000014  177774     5.9          CMP     BUFC(DCT),#-4
3391  016416  003403                     2.6          BLE     .+10
3392  016420  016077  000014  000762     8.8          MOV     BUFC(DCT),@DXBC
3393  016426  052777  000005  000746     7.6          BIS     #FCTNW, @DXCS
3394  016434  000207                     3.5  S01:    RTS     PC
3395
3396  016436  005060  000000             4.9  SSTAT:  CLR     REQ(DCT)
3397  016442  026027  000004  000001     5.9          CMP     DEVSTA(DCT),#DATA
3398  016450  001404                     2.6          BEQ     SS1
3399  016452  026027  000004  000002     5.9          CMP     DEVSTA(DCT),#STA
3400  016460  001017                     2.6          BNE     SS2
3401  016462  012767  000001  177542     6.4  SS1:    MOV     #CUES,  WAIT
3402  016470  116777  177514  000702     8.8          MOVB    DEV,    @DXCA           ;SET DEV
3403  016476  157777  177526  000674    10.0          BISB    @CU,    @DXCA
3404  016504  116077  000016  000672     8.8          MOVB    STS(DCT),@DXOS
3405  016512  052777  000007  000662     7.6          BIS     #FCTNS, @DXCS
3406  016520  000207                     3.5  SS2:    RTS     PC
3407
3408
3409  016522  005060  000000             4.9  SSCUE:  CLR     REQ(DCT)
3410  016526  005760  000004             4.4          TST     DEVSTA(DCT)
3411  016532  001017                     2.6          BNE     SS3
3412  016534  012767  000001  177470     6.4          MOV     #CUES,  WAIT
3413  016542  116777  177442  000630     8.8          MOVB    DEV,    @DXCA
3414  016550  157777  177454  000622    10.0          BISB    @CU,    @DXCA
3415  016556  116077  000016  000620     8.8          MOVB    STS(DCT),@DXOS
3416  016564  052777  000007  000610     7.6          BIS     #FCTNS, @DXCS
3417  016572  000207                     3.5  SS3:    RTS     PC
3418  016574  010167  177426             4.9  SS4:    MOV     TTP,SAVTTP
3419  016600  016705  177042             5.0          MOV     R5S,%5
3420  016604  016704  177042             5.0          MOV     R4S,%4
3421  016610  016703  177042             5.0          MOV     R3S,%3
3422  016614  016702  177042             5.0          MOV     R2S,%2
3423  016620  016701  177042             5.0          MOV     R1S,%1
3424  016624  016700  177042             5.0          MOV     R0S,%0
3425  016630  000137  020220             3.7          JMP     @#CLENUP1
3426
3427
3428
3429                                          ;DT END EXPECTED
3430
3431  016634                                  DTDONE:
3432  016634  032711  00404C             5.3          BIT     #CHDEND!INFDSC,@TTP     ;CH END?
3433  016640  001045                     2.6          BNE     REQES                   ;YES - REQUEST STATUS
```

```
3434  016642  032711  000020          5.3          BIT     #CUDEND,@TTP            ;CU DATA END?
3435  016646  001413                  2.6          BEQ     DTERR                   ;NO - ERROR
3436  016650  062765  000004  000014  6.4          ADD     #4,     BUFC(W)         ;DECREMENT RESID COUNT
3437  016656  002036                  2.6          BGE     REQES                   ;IF OVERFLOW - DO ES
3438  016660  062765  000004  000012  6.4          ADD     #4,     BUFA(W)         ;BUMP BUFFER ADDRESS
3439  016666  016565  000002  000000  7.6          MOV     LREQ(W),REQ(W)          ;REQUEST NEXT DT
3440  016674  000207                  3.5          RTS     PC                      ;ALL DONE
3441
3442  016676  000000                  1.8  DTERR:  HALT                            ;ERROR ON DT
3443
3444                                        ;ES END EXPECTED
3445
3446  016700                              ESDONE:
3447  016700  032711  000002          5.3          BIT     #STKSTB,@TTP            ;STATUS STACKED?
3448  016704  001040                  2.6          BNE     REQUX                   ;YES - REQUEUE
3449  016706  005065  000002          4.9          CLR     LREQ(W)                 ;
3450  016712  005065  000000          4.9          CLR     REQ(W)                  ;
3451  016716  005065  000004          4.9          CLR     DEVSTA(W)               ;SET TO IDLE STATE
3452  016722  032711  000004          5.3          BIT     #CMDCHN,(TTP)
3453  016726  001403                  2.6          BEQ     ES1
3454  016730  012765  000003  000004  6.4          MOV     #CHAIN, DEVSTA(W)
3455  016736  004767  000110          7.0  ES1:    JSR     PC,     TSTCUE
3456  016742  000207                  3.5          RTS     PC
3457
3458                                        ;REQUEUE REQUEST
3459
3460  016744  016565  000002  000000  7.6  REQU:   MOV     LREQ(W),REQ(W)          ;REQUEUE
3461  016752  000207                  3.5          RTS     PC                      ;BACK TO DISPATCH
3462
3463                                        ;REQUEST ENDING STATUS
3464
3465  016754  012765  000014  000016  6.4  REQES:  MOV     #CE!DE, STS(W)          ;PUT IN DESIRED
3466  016762  012765  000003  000000  6.4  REQST:  MOV     #RSTS,  REQ(W)          ;REQUEST
3467  016770  012765  000003  000002  6.4          MOV     #RSTS,  LREQ(W)         ;STATUS
3468  016776  012765  000002  000004  6.4          MOV     #STA,   DEVSTA(W)       ;SET STATE
3469  017004  000207                  3.5          RTS     PC                      ;GET OUT
3470
3471                                        ;STACK STATUS
3472
3473  017006  005767  177212          4.4  REQUX:  TST     MODE                    ;2703 MODE?
3474  017012  001754                  2.6          BEQ     REQU                    ;YES - REQUEUE STATUS
3475  017014  012767  000001  177210  6.4          MOV     #CUES,  WAIT            ;SET WAIT FLAG AGAIN
3476  017022  000207                  3.5          RTS     PC
3477
3478                                        ;HIO RECEIVED
3479
3480  017024  026527  000004  000001  5.9  DXDSC:  CMP     DEVSTA(W),#DATA         ;COMMAND ACTIVE?
3481  017032  001750                  2.6          BEQ     REQES                   ;YES - DO ES
3482
3483  017034  026527  000004  000002  5.9          CMP     DEVSTA(W),#STA          ;STATUS REQUIRED?
3484  017042  001744                  2.6          BEQ     REQES                   ;YES - PRESENT IT
3485
3486  017044  004767  000002          7.0          JSR     PC,     TSTCUE          ;CHECK FOR CUE
3487  017050  000207                  3.5          RTS     PC                      ;AND RETURN
3488
3489                                        ;TEST FOR CUE REQUIRED
```

```
3490
3491  017052                                        TSTCUE:
3492
3493  017052  005767  177146          4.4           TST     MODE                    ;2703
3494  017056  001424                  2.6           BEQ     TSTX                    ;YES - NO CUE
3495
3496  017060  005765  000004          4.4           TST     DEVSTA(W)               ;DEVICE IDLE?
3497  017064  001021                  2.6           BNE     TSTX
3498
3499  017066  032777  000400  000306  7.7           BIT     #CUBSY, @DXCS           ;CU BUSY SET?
3500  017074  001415                  2.6           BEQ     TSTX
3501  017076  032777  000010  000272  7.7           BIT     #ISSREJ,@DXDS           ;ISS REJECTED?
3502  017104  001411                  2.6           BEQ     TSTX
3503
3504  017106  012765  000040  000016  6.4           MOV     #CUE,   STS(W)          ;SET STATUS
3505  017114  012765  000004  000000  6.4           MOV     #RCUE,  REQ(W)          ;AND REQUEST
3506  017122  012765  000004  000002  6.4           MOV     #RCUE,  LREQ(W)         ;
3507
3508  017130  000207                  3.5   TSTX:   RTS     PC                      ;RETURN
3509
3510
3511                                              ;ISS HANDLER
3512
3513  017132                                      DXISS:
3514
3515                                              ;SET UP STATUS BYTE FROM INFO IN T/T
3516
3517  017132  005065  000016          4.9           CLR     STS(W)                  ;RESET TO START
3518  017136  032711  002000          5.3           BIT     #UCHKS, @TTP            ;UNIT CHECK?
3519  017142  001415                  2.6           BEQ     ISSH1                   ;
3520  017144  052765  000002  000016  6.4           BIS     #UC,    STS(W)          ;
3521  017152  005765  000006          4.4           TST     ONLF(W)                 ;DEVICE ONLINE?
3522  017156  001404                  2.6           BEQ     ISSH1A                  ;NO - SET INT REQ
3523  017160  052765  000200  000010  6.4           BIS     #CMDREJ,SNS(W)          ;SET COMMAND REJECT IN SENSE
3524  017166  000403                  2.6           BR      ISSH1                   ;GO ON
3525
3526  017170  052765  000100  000010  6.4   ISSH1A: BIS     #INTREQ,SNS(W)          ;SET INTERVENTION IN SENSE
3527
3528  017176  032711  001000          5.3   ISSH1:  BIT     #CHENDS,@TTP            ;CHANNEL END?
3529  017202  001403                  2.6           BEQ     ISSH2                   ;
3530  017204  052765  000014  000016  6.4           BIS     #CE!DE, STS(W)          ;
3531
3532                                              ;IF STATUS NON-ZERO, HANDLE STACKED CASE
3533
3534  017212  005765  000016          4.4   ISSH2:  TST     STS(W)                  ;STATUS ZERO?
3535  017216  001402                  2.6           BEQ     ISSH3                   ;YES - GO ON
3536  017220  000167  177454          4.9           JMP     ESDONE                  ;NO - DO ES
3537
3538                                              ;COMMAND ACCEPTED - HANDLE TIO, SENSE, READ, WRITE
3539
3540  017224  105761  000003          4.4   ISSH3:  TSTB    CUCRT(TTP)              ;TIO?
3541  017230  001425                  2.6           BEQ     ISSHX                   ;YES - ALL DONE NOW
3542  017232  122761  000004  000003  5.9           CMPB    #SENSE, CUCRT(TTP)      ;SENSE?
3543  017240  001022                  2.6           BNE     ISSH4                   ;NO
3544
3545                                              ;HANDLE SENSE HERE
```

```
3546
3547  017242  012765  000001  000004      6.4           MOV     #DATA,  DEVSTA(W)       ;SET STATE
3548  017250  012765  000010  000012      6.4           MOV     #SNS,   BUFA(W)         ;SET BA
3549  017256  060565  000012              4.9           ADD     W,      BUFA(W)         ;
3550  017262  012765  177777  000014      6.4           MOV     #-1,    BUFC(W)         ;SET BC
3551  017270  012765  000002  000000      6.4           MOV     #ROUTP, REQ(W)          ;REQUEST OUTPUT
3552  017276  012765  000002  000002      6.4           MOV     #ROUTP, LREQ(W)         ;
3553  017304  000207                      3.5   ISSHX:  RTS     PC                      ;ALL DONE
3554
3555                                              ;READ, WRITE
3556
3557          000400                              ZFUB=256.
3558  017306  005065  000010              4.9   ISSH4:  CLR     SNS(W)                  ;CLEAR SENSE
3559  017312  012765  000001  000004      6.4           MOV     #DATA,  DEVSTA(W)       ;SET STATE
3560  017320  012765  000020  000012      6.4           MOV     #DXBF,  BUFA(W)         ;SET BA
3561  017326  060565  000012              4.9           ADD     W,      BUFA(W)         ;
3562  017332  012765  177400  000014      6.4           MOV     #-ZFUB, BUFC(W)         ;SET BC
3563  017340  132761  000001  000003      6.5           BITB    #1,     CUCRT(TTP)      ;WRITE?
3564  017346  001404                      2.6           BEQ     ISSH5                   ;NO
3565  017350  012765  000001  000000      6.4           MOV     #RINP,  REQ(W)          ;YES - REQUEST INPUT
3566  017356  000403                      2.6           BR      ISSH6                   ;
3567  017360  012765  000002  000000      6.4   ISSH5:  MOV     #ROUTP, REQ(W)          ;REQUEST OUTPUT
3568  017366  016565  000000  000002      7.6   ISSH6:  MOV     REQ(W), LREQ(W)         ;
3569  017374  000207                      3.5           RTS     PC                      ;ALL DONE
3570
3571
3572  017376  176200                              DXDS:   176200                  ;DEVICE STATUS ->TT
3573  017400  176202                              DXCA:   176202                  ;COMMAND AND ADDRESS ->TT
3574  017402  176204                              DXCS:   176204                  ;CONTROL UNIT STATUS
3575  017404  176206                              DXOS:   176206                  ;OFFSET AND STATUS
3576  017406  176210                              DXBA:   176210                  ;BUS ADDRESS FOR NPR'S
3577  017410  176212                              DXBC:   176212                  ;BYTE COUNT
3578  017412  176214                              DXMO:   176214                  ;MAINTENANCE OUT
3579  017414  176216                              DXMI:   176216                  ;MAINTENANCE IN
3580  017416  176220                              DXCB:   176220                  ;CONTROL BITS
3581  017420  176222                              DXND:   176222                  ;NPR DATA
3582  017422  176224                              DXES:   176224                  ;EXTRA SIGNALS
3583  017424  176226                              DXMOB:  176226                  ;MAINTENANCE OUT BUFFERED
3584  017426  176230                              DXES1:  176230          ;EXTRA EXTRA SIGNALS
3585
3586                                              ;LEGAL ADDRESS LIST
3587
3588  017430                                      DXLEGA:
3589  017430  000020                              .WORD   20              ;PATCH PATCH CH ADRS HERE
3590  017432  177777                              .WORD   -1
3591  017434  177777                              .WORD   -1
3592  017436  177777                              .WORD   -1
3593  017440  177777                              .WORD   -1
3594  017442  177777                              .WORD   -1
3595  017444  177777                              .WORD   -1
3596  017446  177777                              .WORD   -1
3597  017450  177777                              .WORD   -1
3598  017452  177777                              .WORD   -1
3599  017454  177777                              .WORD   -1
3600  017456  177777                              .WORD   -1
3601  017460  177777                              .WORD   -1
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 3602  017462  177777                    .WORD   -1
 3603  017464  177777                    .WORD   -1
 3604  017466  177777                    .WORD   -1
 3605  017470  177777                    .WORD   -1
 3606
 3607  017472                            SCALD.ADRS:
 3608
 3609  017472  000000                    .WORD   0
 3610  017474  000000                    .WORD   0
 3611  017476  000000                    .WORD   0
 3612  017500  000000                    .WORD   0
 3613  017502  000000                    .WORD   0
 3614  017504  000000                    .WORD   0
 3615  017506  000000                    .WORD   0
 3616  017510  000000                    .WORD   0
 3617  017512  000000                    .WORD   0
 3618  017514  000000                    .WORD   0
 3619  017516  000000                    .WORD   0
 3620  017520  000000                    .WORD   0
 3621  017522  000000                    .WORD   0
 3622  017524  000000                    .WORD   0
 3623  017526  000000                    .WORD   0
 3624  017530  000000                    .WORD   0
 3625
 3626
 3627                                    ;LIST OF DEFAULT COMMANDS
 3628
 3629  017532                            DFLT.CMD:
 3630
 3631  017532  000400                            TIOC                    ;TEST I/O COMMAND
 3632  017534  000001                            WRITEC                  ;WRITE COMMAND
 3633  017536  000002                            READC                   ;READ COMMAND
 3634  017540  000403                            NOPC                    ;NOP COMMAND
 3635  017542  000004                            SENSEC                  ;SENSE COMMAND
 3636  017544  000405                            ILLC                    ;ILLAGAL COMMAND
 3637  017546  177777                            -1                      ;LIST TERMINATOR
 3638  017550  177777                            -1                      ;LIST TERMINATOR
 3639  017552  177777                            -1                      ;LIST TERMINATOR
 3640  017554  177777                            -1                      ;LIST TERMINATOR
 3641  017556  177777                            -1                      ;LIST TERMINATOR
 3642  017560  177777                            -1                      ;LIST TERMINATOR
 3643  017562  177777                            -1                      ;LIST TERMINATOR
 3644  017564  177777                            -1                      ;LIST TERMINATOR
 3645  017566  177777                            -1                      ;LIST TERMINATOR
 3646  017570  177777                            -1                      ;LIST TERMINATOR
 3647
 3648
 3649  017572                            CMD.STAT:
 3650  017572      000                           .BYTE   0
 3651  017573      000                           .BYTE   0
 3652  017574      C00                           .BYTE   0
 3653  017575      014                           .BYTE   CE!DE
 3654  017576      000                           .BYTE   0
 3655  017577      002                           .BYTE   UC
 3656  017600      002                           .BYTE   UC
 3657  017601      002                           .BYTE   UC
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3658  017602  002                                   .BYTE   UC
3659  017603  002                                   .BYTE   UC
3660  017604  002                                   .BYTE   UC
3661  017605  002                                   .BYTE   UC
3662  017606  002                                   .BYTE   UC
3663  017607  002                                   .BYTE   UC
3664  017610  002                                   .BYTE   UC
3665  017611  002                                   .BYTE   UC
3666                                        ;DEFAULT STATUS LIST
3667
3668  017612                                DFLT.STAT:
3669  017612  000                                   .BYTE   0               ;TIO ACCEPT
3670  017613  000                                   .BYTE   0               ;WBITE ACCEPT
3671  017614  000                                   .BYTE   0               ;READ ACCEPT
3672  017615  014                                   .BYTE   CE!DE           ;NOP GETS IMMEDIATE END
3673  017616  000                                   .BYTE   0               ;SENSE ACCEPT
3674  017617  002                                   .BYTE   UC
3675  017620  002                                   .BYTE   UC
3676  017621  002                                   .BYTE   UC
3677  017622  002                                   .BYTE   UC
3678  017623  002                                   .BYTE   UC
3679  017624  002                                   .BYTE   UC
3680  017625  002                                   .BYTE   UC
3681  017626  002                                   .BYTE   UC
3682  017627  002                                   .BYTE   UC
3683  017630  002                                   .BYTE   UC
3684  017631  002                                   .BYTE   UC
3685
3686                                        ;DEVICE CONTROL TABLE (DCT) POINTER
3687
3688          000000                        N=0
3689  017632                                DCTP:
3690  017632  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3691          000001                        N=N+1
3692  017634  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3693          000002                        N=N+1
3694  017636  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3695          000003                        N=N+1
3696  017640  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3697          000004                        N=N+1
3698  017642  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3699          000005                        N=N+1
3700  017644  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3701          000006                        N=N+1
3702  017646  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3703          000007                        N=N+1
3704  017650  000000                        .WORD   0                       ;POINTER TO DCT DEVICE 'N
3705          000010                        N=N+1
3706
3707
3708                                        ;DL11 C,D,E (ASYNCHRONOUS R/T) TRANSMITTER SERVICE ROUTINE
3709
3710  017652  010146              4.9   DL.XMT: MOV     R1,-(SP)        ;SAVE REGISTER 1 ON STACK
3711  017654  010246              4.9           MOV     R2,-(SP)        ;SAVE REGISTER 2 ON STACK
3712  017656  011501              3.8           MOV     (R5),R1
3713  017660  006301              2.3           ASL     R1              ;FORM MOD(2) INDEX
```

```
3714  017662  010102                    2.3          MOV     R1,R2           ;DUPLICATE LINE NUMBER
3715  017664  006302                    2.3          ASL     R2              ;FORM MOD10(8) INDEX
3716  017666  006302                    2.3          ASL     R2              ;
3717  017670  066702  162004            5.0          ADD     AD.DLX,R2       ;FORM DEVICE ADDRESS
3718  017674  105712                    3.2          TSTB    @R2             ;TEST FOR TRANS DONE INC TO BUFF
3719  017676  100407                    2.6          BMI     1$              ;YES
3720  017700  011203                    3.8          MOV     @R2,R3          ;IS DISPLAY
3721  017702  010304                    2.3          MOV     R3,R4           ;SHOULD BE
3722  017704  052704  000200            3.8          BIS     #BIT7,R4                ;XMIT READY
3723  017710  042704  174000            4.4          BIC     #174000,R4
3724                                                ;
3725                                                ;NOTE:
3726                                                ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3727                                                ;       FOR EXTENDED ERROR DISPLAY
3728                                                ;       BIT 07:(R4) ONLY SIGNIFICANT BIT (SHOULD BE)
3729                                                ;
3730                                                ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3731                                                ;
3732                                                ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3733                                                ;
3734  017714  104000                                        HLT                     ;NO REPORT ERROR
3735  017716  105261  020114            4.9  1$:     INCB    DLDATA(R1)      ;INCREMENT SAVE DATA
3736  017722  142761  000340  020114    7.0          BICB    #340,DLDATA(R1)
3737  017730  005722                    3.2  DLOUT:  TST     (R2)+           ;INC TO XMIT BUFF
3738  017732  116112  020114            6.4          MOVB    DLDATA(R1),(R2) ;TRANSMIT DATA
3739  017736  000167  000252            4.9          JMP     CLEANUP
3740
3741                                                ;DL11 C,D,E (ASCHRONOUS R/T) RECEIVER SERVICE ROUTINE
3742
3743  017742  010146                    4.9  DL.RCV: MOV     R1,-(SP)        ;SAVE REGISTER 1 ON STACK
3744  017744  010246                    4.9          MOV     R2,-(SP)        ;SAVE REGISTER 2 ON STACK
3745  017746  011501                    3.8          MOV     (R5),R1
3746  017750  006301                    2.3          ASL     R1              ;FORM MOD(2) INDEX
3747  017752  010102                    2.3          MOV     R1,R2           ;DUPLICATE LINE NUMBER
3748  017754  006302                    2.3          ASL     R2              ;FORM MOD10(8) INDEX
3749  017756  006302                    2.3          ASL     R2              ;
3750  017760  066702  161644            5.0          ADD     AD.DLC,R2       ;SET UP DEVICE CSR ADDRESS
3751  017764  105712                    3.2          TSTB    (R2)            ;DONE
3752  017766  100405                    2.6          BMI     2$              ;YES
3753  017770  011203                    3.8          MOV     @R2,R3          ;IS DISPLAY
3754  017772  010304                    2.3          MOV     R3,R4           ;SHOULD BE
3755  017774  052704  000200            3.8          BIS     #BIT7,R4                ;RECV DONE
3756                                                ;
3757                                                ;NOTE:
3758                                                ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3759                                                ;       FOR EXTENDED ERROR DISPLAY
3760                                                ;       BIT 07:(R4) ONLY SIGNIFICANT BIT (SHOULD BE)
3761                                                ;
3762                                                ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3763                                                ;
3764                                                ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3765                                                ;
3766  020000  104000                                        HLT                     ;NO, FALSE INTERRUPT
3767  020002  005722                    3.2  2$:     TST     (R2)+
3768  020004  005712                    3.2          TST     (R2)            ;ERROR BIT SET?
3769  020006  100005                    2.6          BPL     3$              ;NO
```

```
3770  020010  011203                    3.8          MOV     @R2,R3          ;IS DISPLAY
3771  020012  010304                    2.3          MOV     R3,R4           ;SHOULD BE
3772  020014  042704  174000            4.4          BIC     #174000,R4              ;ERROR BIT #15 SET
3773                                                ;
3774                                    ;NOTE:      ;
3775                                                ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3776                                                ;       FOR EXTENDED ERROR DISPLAY
3777                                                ;       BIT 15:(R4) ONLY SIGNIFICANT BIT SHOULD BE
3778                                                ;
3779                                                ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3780                                                ;
3781                                                ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3782                                                ;
3783  020020  104000                                        HLT
3784
3785  020022  011267  000064            6.4  3$:     MOV     (R2),   DLSAVE  ;SAVE THE DATA
3786  020026  126761  000060  020115     7.1          CMPB    DLSAVE, DLDATA+1(R1) ;TEST THE DATA
3787  020034  001407                     2.6          BEQ     4$              ;BRANCH IF OK
3788  020036  116104  020115             5.0          MOVB    DLDATA+1(R1),R4         ;SHOULD BE
3789  020042  016703  000044             5.0          MOV     DLSAVE, R3      ;IS DISPLAY
3790  020046  042704  174000             4.4          BIC     #174000,R4
3791                                                ;
3792                                    ;NOTE:      ;
3793                                                ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3794                                                ;       FOR EXTENDED ERROR DISPLAY
3795                                                ;       BITS 07:00:(R4) ONLY SIGNIFICANT BITS (SHOULD BE)
3796                                                ;
3797                                                ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3798                                                ;
3799                                                ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3800                                                ;
3801  020052  104000                                        HLT                     ;FALSE DATA
3802  020054  122761  000037  020115     5.9  4$:     CMPB    #37,DLDATA+1(R1)        ;UPPER DATA LIMIT FOR 5 BIT ASCII
3803  020062  001403                     2.6          BEQ     DLRX1           ;YEY
3804  020064  105261  020115             4.9          INCB    DLDATA+1(R1)    ;NO INCREMENT DATA
3805  020070  000403                     2.6          BR      DLRX2
3806  020072  112761  000000  020115     6.4  DLRX1:  MOVB    #0,DLDATA+1(R1) ;REINITIALIZE DATA
3807  020100  052761  001000  001342     6.4  DLRX2:  BIS     #FL.DLC,MAP(R1) ;SET FLAG TO INDICATE LINE SERVICED
3808  020106  000167  000102             4.9          JMP     CLEANUP
3809
3810  020112  000000                          DLSAVE: 0                       ;DATA SAVE
3811
3812                                          ;DL11 CSR AND DATA STORAGE
3813
3814
3815  020114                               DLDATA:
3816  020114  000000                               0                       ;DL11 DATA, LINE 0
3817  020116  000000                               0                       ;DL11 DATA, LINE 1
3818  020120  000000                               0                       ;DL11 DATA, LINE 2
3819  020122  000000                               0                       ;DL11 DATA, LINE 3
3820  020124  000000                               0                       ;DL11 DATA, LINE 4
3821  020126  000000                               0                       ;DL11 DATA, LINE 5
3822  020130  000000                               0                       ;DL11 DATA, LINE 6
3823  020132  000000                               0                       ;DL11 DATA, LINE 7
3824  020134  000000                               0                       ;DL11 DATA, LINE 10
3825  020136  000000                               0                       ;DL11 DATA, LINE 11
```

```
 3826  020140  000000                                    0                       ;DL11 DATA, LINE 12
 3827  020142  000000                                    0                       ;DL11 DATA, LINE 13
 3828  020144  000000                                    0                       ;DL11 DATA, LINE 14
 3829  020146  000000                                    0                       ;DL11 DATA, LINE 15
 3830  020150  000000                                    0                       ;DL11 DATA, LINE 16
 3831  020152  000000                                    0                       ;DL11 DATA, LINE 17
 3832  020154  000000                                    0                       ;DL11 DATA, LINE 20
 3833  020156  000000                                    0                       ;DL11 DATA, LINE 21
 3834  020160  000000                                    0                       ;DL11 DATA, LINE 22
 3835  020162  000000                                    0                       ;DL11 DATA, LINE 23
 3836  020164  000000                                    0                       ;DL11 DATA, LINE 24
 3837  020166  000000                                    0                       ;DL11 DATA, LINE 25
 3838  020170  000000                                    0                       ;DL11 DATA, LINE 26
 3839  020172  000000                                    0                       ;DL11 DATA, LINE 27
 3840  020174  000000                                    0                       ;DL11 DATA, LINE 30
 3841  020176  000000                                    0                       ;DL11 DATA, LINE 31
 3842  020200  000000                                    0                       ;DL11 DATA, LINE 32
 3843  020202  000000                                    0                       ;DL11 DATA, LINE 33
 3844  020204  000000                                    0                       ;DL11 DATA, LINE 34
 3845  020206  000000                                    0                       ;DL11 DATA, LINE 35
 3846  020210  000000                                    0                       ;DL11 DATA, LINE 36
 3847  020212  000000                                    0                       ;DL11 DATA, LINE 37
 3848
 3849  020214  012602                        3.8  CLEANUP: MOV     (SP)+,R2
 3850  020216  012601                        3.8          MOV     (SP)+,R1
 3851  020220  012605                        3.8  CLENUP1: MOV     (SP)+,R5
 3852
 3853
 3854
 3855  020222  000002                        4.8          RTI
 3856                    ;DJ11 (ASYNCHRONOUS) TRANSMITTER SERVICE ROUTINE
 3857
 3858  020224  010146                        4.9  DJ.XMT: MOV     R1,     -(SP)   ;SAVE
 3859  020226  010246                        4.9          MOV     R2,     -(SP)   ;REGISTERS
 3860  020230  010346                        4.9          MOV     R3,     -(SP)   ;ON
 3861  020232  010446                        4.9          MOV     R4,     -(SP)   ;STACK
 3862
 3863  020234  011501                        3.8          MOV     (R5),   R1      ;FECTH DEVICE # >R1
 3864
 3865  020236  010102                        2.3          MOV     R1,     R2      ;
 3866
 3867  020240  006302                        2.3          ASL     R2              ;FORM
 3868  020242  006302                        2.3          ASL     R2              ;MOD10 (8)
 3869  020244  006302                        2.3          ASL     R2              ;OFFSET >R2
 3870
 3871  020246  010203                        2.3          MOV     R2,     R3      ;RECORD
 3872
 3873  020250  006303                        2.3          ASL     R3              ;SCALE MOD20 (16)
 3874
 3875
 3876  020252  066702  161354              5.0          ADD     AD.DJ,  R2      ;FORM DEVICE BASE ADDRESS
 3877
 3878
 3879  020256  005712                        3.2          TST     (R2)            ;TEST XMIT READY CSR BIT 15
 3880
 3881  020260  100407                        2.6          BMI     1$              ;OK BRANCHES
```

```
3882
3883                                                    ;       *******
3884  020262  011203                            3.8             MOV     (R2),   R3      ;IS DISPLAY
3885  020264  010304                            2.3             MOV     R3,     R4      ;SHOULD BE
3886  020266  042704  074000                    4.4             BIC     #74000,R4
3887
3888  020272  052704  100000                    3.8             BIS     #100000,R4      ;READY BIT 15
3889
3890                                                    ;
3891                                                    ;NOTE:
3892                                                    ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3893                                                    ;       FOR EXTENDED ERROR DISPLAY
3894                                                    ;       BIT 15:(R4) ONLY SIGNIFICANT BIT SHOULD BE
3895                                                    ;
3896                                                    ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3897                                                    ;
3898                                                    ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3899                                                    ;
3900  020276  104000                                    HLT                             ;ERROR XMIT READY BIT 15 FAILURE
3901
3902  020300  116204  000007                    5.0 1$:     MOVB    7(R2),  R4      ;FETCH XMIT BUFFER LINE REQUEST FIELD
3903  020304  060304                            2.3         ADD     R3,     R4      ;COMBINE OFFSET AND LINE #
3904  020306  006304                            2.3         ASL     R4              ;SCALE MOD20(16) XMIT CHARACTER OFFSET
3905  020310  016462  030420  000006            7.6         MOV     DJ.XTBL(R4),6(R2);TRANSMIT DATA CHARACTER ON CURRENT LINE
3906  020316  105264  030420                    4.9         INCB    DJ.XTBL(R4)     ;ADVANCE TO NEXT CHARACTER
3907  020322  042764  000340  030420            7.0         BIC     #340,DJ.XTBL(R4);MASK TO LEVEL 5
3908                                                    ;NOTE
3909                                                    ;       FOR HIGHER DATA LEVEL VERIFICATION
3910                                                    ;       MODIFY #340 ENTRY TO THE FOLLOWING:
3911                                                    ;       #300 = 6 LEVEL CODE
3912                                                    ;       #200 = 7 LEVEL CODE
3913                                                    ;       #400 = 8 LEVEL CODE
3914                                                    ;
3915                                                    ;       BIC     #340,DJ.EXP(R4) IN DJ.RCV HAS TO BE MODIFIED ALSO.
3916  020330  005267  000172                    4.9         INC     DJ.XTLY         ;ADVANCE DJ XMIT CHARACTER TALLY
3917  020334  005712                            3.2         TST     (R2)                    ;TEST ADDITIONAL ACTIVITY
3918  020336  100760                            2.6         BMI     1$              ;YES SERVICE ADDITIONAL LINES
3919
3920  020340  000167  000146                    4.9         JMP     CLENDJ          ;NO RESTORE REGISTERS AND EXIT
3921
3922                                                    ;
3923
3924
3925                                                    ;DJ11 (ASYNCHRONOUS) RECEIVER SERVICE ROUTINE
3926
3927  020344  010146                            4.9 DJ.RCV: MOV     R1,     -(SP)   ;SAVE
3928  020346  010246                            4.9         MOV     R2,     -(SP)   ;REGISTERS
3929  020350  010346                            4.9         MOV     R3,     -(SP)   ;ON
3930  020352  010446                            4.9         MOV     R4,     -(SP)   ;STACK
3931
3932  020354  011501                            3.8         MOV     (R5),   R1      ;FETCH DEVICE # >R1
3933
3934  020356  006301                            2.3         ASL     R1
3935  020360  010102                            2.3         MOV     R1,R2
3936  020362  006302                            2.3         ASL     R2              ;MOD10 (8)
3937  020364  006302                            2.3         ASL     R2              ;OFFSET >R2
```

```
3938
3939
3940  020366  010267  000140          4.9          MOV     R2,DJ.TEMP      ;RECORD MOD10 OFFSET
3941  020372  006367  000134          4.9          ASL     DJ.TEMP         ;OFFSET
3942  020376  066702  161230          5.0          ADD     AD.DJ,  R2      ;FORM DEVICE BASE ADDRESS
3943
3944  020402  011203                  3.8          MOV     (R2),   R3      ;RECORD CSR (IS)
3945  020404  105703                  2.3          TSTB    R3              ;TEST DONE (RCV)
3946
3947  020406  100405                  2.6          BMI     1$              ;OK BRANCHES
3948
3949  020410  010304                  2.3          MOV     R3,     R4      ;MOVE IS TO
3950  020412  052704  000200          3.8          BIS     #200,   R4      ;SHOULD BE DONE BIT 7
3951  020416  006201                  2.3          ASR     R1
3952
3953                                                ;NOTE:
3954                                                ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3955                                                ;       FOR EXTENDED ERROR DISPLAY
3956                                                ;       BIT 07:(R4) ONLY SIGNIFICANT BIT (SHOULD BE)
3957
3958                                                ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3959
3960                                                ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3961
3962
3963  020420  104000                                HLT                             ;ERROR DONE BIT 7 FAILURE
3964
3965  020422  016203  000002          5.0  1$:     MOV     2(R2),  R3      ;RECORD RECEIVED DATA WORD >R3
3966
3967  020426  010304                  2.3          MOV     R3,     R4
3968  020430  000304                  2.3          SWAB    R4              ;LINE AND STATUS TO LOW BYTE
3969  020432  042704  177760          4.4          BIC     #177760,R4      ;EXTRACT LINE #
3970
3971  020436  066704  000070          5.0          ADD     DJ.TEMP,R4      ;COMBINE OFFSET (MOD10 + LINE#)
3972  020442  006304                  2.3          ASL     R4              ;SCALE MOD20(16) TO RECV TABLE DEPTH
3973  020444  020364  031022          4.4          CMP     R3,DJ.EXP(R4)   ;DATA COMPARE IS WITH SHOULD BE
3974  020450  001404                  2.6          BEQ     2$              ;OK BRANCHES
3975
3976  020452  016404  031022          5.0          MOV     DJ.EXP(R4),R4   ;FETCH SHOULD BE
3977  020456  006201                  2.3          ASR     R1
3978
3979                                                ;NOTE:
3980                                                ;       MODIFY HLT TO HLT+4 IE (104000=104004)
3981                                                ;       FOR EXTENDED ERROR DISPLAY
3982
3983                                                ;       PC      PS      SP      UNIT    DEVADR  WAS     SHOULD BE
3984
3985                                                ;       (R7)    (PSW)   (R6)    (R1)    (R2)    (R3)    (R4)
3986
3987
3988  020460  104000                                HLT                             ;ERROR DATA COMPARE FAILURE
3989
3990  020462  105264  031022          4.9  2$:     INCB    DJ.EXP(R4)      ;ADVANCE EXPECTED TABLE ENTRY TO NEXT CHARACTER
3991  020466  142764  000340  031022  7.0          BICB    #340,DJ.EXP(R4) ;MASK TO LEVEL 5
3992  020474  005267  000030          4.9          INC     DJ.RTLY         ;ADVANCE CHARACTER RECEIVED TALLY
3993  020500  105712                  3.2          TSTB    (R2)            ;TEST ADDITIONAL LINE ACTIVITY
```

```
3994
3995  020502  100747                    2.6          BMI     1$              ;YES SERVICE ADDITIONAL LINES
3996
3997  020504  052761  004000  001342    6.4          BIS     #FL.DJ, MAP(R1) ;SET FLAG
3998
3999  020512  012604                    3.8  CLENDJ: MOV     (SP)+,  R4      ;RESTORE
4000  020514  012603                    3.8          MOV     (SP)+,  R3      ;REGISTERS
4001  020516  012602                    3.8          MOV     (SP)+,  R2      ;FROM
4002  020520  012601                    3.8          MOV     (SP)+,  R1      ;STACK
4003  020522  012605                    3.8          MOV     (SP)+,  R5      ;
4004
4005  020524  000002                    4.8          RTI                     ;EXIT
4006
4007                                          ;
4008
4009  020526  000000                        DJ.XTLY:        0               ;TRANSMITTED CHARACTER TALLY
4010  020530  000000                        DJ.RTLY:        0               ;RECEIVER  CHARACTER TALLY
4011  020532  000000                        DJ.TEMP:        0               ;WORK STORAGE
4012
```

```
4013
4014                                        ;CONSOL TELETYPE PUNCH SERVICE ROUTINE
4015
4016  020534  032777  000200  002254  7.7   CTYP:   BIT     #BIT7,@CTPS     ;DONE?
4017  020542  001001                  2.6           BNE     .+4             ;YES
4018  020544  104000                                HLT                     ;NO,REPORT FALSE INTERRUPT
4019  020546  105267  000040          4.9           INCB    CTPDAT          ;INC TRANSMIT DATA
4020  020552  122767  000147  000032  5.9           CMPB    #147,CTPDAT     ;TEST FOR UPPER LIMIT
4021  020560  001002                  2.6           BNE     CTP1
4022  020562  105067  000024          4.9           CLRB    CTPDAT          ;REINITIALIZE XMIT DATA
4023  020566  116777  000020  002224  8.8   CTP1:   MOVB    CTPDAT,@CTPB    ;TRANSMIT DATA
4024  020574  052767  000001  160502  6.4           BIS     #FL.ANC,RU.MAP
4025  020602  052767  000001  160476  6.4           BIS     #FL.CTY,RU.ANC
4026  020610  000002                  4.8           RTI                     ;RETURN
4027
4028  020612  000000                        CTPDAT: 0                       ;TRANSMIT DATA
4029
4030
4031                                        ;CONSOL TELETYPE READER SERVICE ROUTINE
4032
4033  020614  032777  000200  002170  7.7   CTYR:   BIT     #BIT7,@CTKS             ;DONE?
4034  020622  001001                  2.6           BNE     .+4             ;YES
4035  020624  104000                                HLT                     ;NO,REPORT FALSE INTERRUPT
4036  020626  105777  002162          5.6           TSTB    @CTKB           ;TEST FOR LEADER
4037  020632  001421                  2.6           BEQ     CTYR4           ;BRANCH IF LEADER
4038  020634  127767  002154  000060  8.3           CMPB    @CTKB,CTKDAT    ;NOT LEADER TEST FOR DATA
4039  020642  001413                  2.6           BEQ     CTYR3           ;BRANCH IF DATA
4040  020644  017767  002144  000052  8.8           MOV     @CTKB,  CTKRCV  ;RECORD CHARACTER
4041  020652  042767  000200  000044  7.0           BIC     #200,   CTKRCV  ;MASK OFF 8TH BIT
4042  020660  122777  000007  002126  7.1           CMPB    #7,@CTKB        ;NOT DATA, TEST FOR BELL
4043  020666  001412                  2.6           BEQ     CTYR2           ;BRANCH IF BELL
4044  020670  104000                                HLT                     ;NONE OF ABOVE,REPORT ERROR
4045  020672  105267  000024          4.9   CTYR3:  INCB    CTKDAT          ;INC DATA
4046  020676  122767  000147  000016  5.9   CTYR4:  CMPB    #147,CTKDAT     ;TEST FOR UPPER LIMIT
4047  020704  001003                  2.6           BNE     CTYR2
4048  020706  112767  000001  000006  6.4           MOVB    #1,CTKDAT       ;REINIT RCV DATA
4049  020714  005277  002072          6.1   CTYR2:  INC     @CTKS           ;START READER
4050  020720  000002                  4.8           RTT
4051
4052  020722  000001                        CTKDAT: 1                       ;RCV DATA
4053
4054  020724  000000                        CTKRCV: 0                       ;RCV DATA RECORDED
4055                                        ;*****************************************************************************
4056
4057                                        ;LINE PRINTER TEST SECTION
4058                                        ;HARDWARE REGISTERS
4059
4060  020726  177514                        LPS:    177514                  ;LINE PRINTER STATUS
4061                                                                        ;BIT15=ERROR
4062                                                                        ;BIT7=READY
4063                                                                        ;BIT6=INTERRUPT ENABLE
4064  020730  177516                        LPB:    177516                  ;DATA BUFFER REGISTER
4065                                                                        ;BITS 0-6=7 BIT ASCII CHARACTER
4066                                        ;MEMORY LOCATIONS USED AS FLAGS AND COUNTERS
4067  020732  000120                        LPSIZE: 120                     ;MAXIMUM LINE LENGTH IN CHARACTERS
4068  020734  000120                        LINGTH: 120                     ;NUMBER OF CHARACTERS PER LINE
```

```
4069  020736  000120                          CHRLIN: 120                     ;LINE LENGTH IN CHARACTERS
4070  020740  000040                          CARGEN: 40                      ;CHARACTER GENERATOR
4071
4072                                          ;LPVEC. LINE PRINTER INTERRUPT SERVICE ROUTINE
4073
4074  020742  005777  177760          5.6   LPVECT: TST     @LPS            ;ERROR
4075  020746  100001                  2.6           BPL     .+4             ;NO
4076  020750  104000                          HLT                             ;YES, REPORT ERROR
4077  020752  105777  177750          5.6           TSTB    @LPS            ;READY
4078  020756  100401                  2.6           BMI     .+4             ;YES
4079  020760  104000                          HLT                             ;NO
4080  020762  005267  177752          4.9   LP0:    INC     CARGEN          ;GENERATE NEXT CHARACTER
4081  020766  022767  000140  177744  5.9           CMP     #140,   CARGEN  ;64 CHARACTER LINE PRINTER
4082  020774  001003                  2.6           BNE     LP1
4083  020776  012767  000040  177734  6.4           MOV     #40,    CARGEN  ;RE-INITIALIZE CHARACTER GENERATOR
4084  021004  005367  177726          4.9   LP1:    DEC     CHRLIN          ;COUNT CHARACTERS
4085  021010  001015                  2.6           BNE     LP2             ;BRANCH IF NOT AT LINE'S END
4086  021012  012777  000012  177710  7.6           MOV     #12,    @LPB    ;YES, LINE FEED
4087  021020  005367  177710          4.9           DEC     LINGTH          ;END OF WEDGE
4089  021024  001003                  2.6           BNE     LP3             ;NO
4089  021026  016767  177700  177700  7.6           MOV     LPSIZE, LINGTH  ;YES, REINITIALIZE LINE LENGHT
4090  021034  016767  177674  177674  7.6   LP3:    MOV     LINGTH, CHRLIN  ;DECREASE # OF CHAR PER LINE
4091  021042  000002                  4.8           RTI
4092
4093  021044  016777  177670  177656  8.8   LP2:    MOV     CARGEN, @LPB    ;TRANSMIT CHARACTER
4094  021052  052767  000001  160224  6.4           BIS     #FL.ANC,RU.MAP
4095  021060  052767  000002  160220  6.4           BIS     #FL.LP,RU.ANC
4096  021066  000002                  4.8           RTI
4097                                          ;TC11 DECTAPE EXERCISER
4098
4099                                          ;CONTROL REGISTER ADDRESSES
4100
4101  021070  177342                  TCCM:   177342                  ;TC COMMAND REGISTER
4102  021072  177340                  TCST:   177340                  ;TC STATUS REGISTER
4103  021074  177350                  TCDT:   177350                  ;TC DATA REGISTER
4104  021076  177344                  TCWC:   177344                  ;TC WORD COUNT
4105  021100  177346                  TCBA:   177346                  ;TC BUS ADDRESS
4106                                  ;CONSTANTS FOR FUNCTION CODE
4107  021102  000214                  TCIV:   214                     ;TC INTERRUPT VECTOR
4108  021104  000216                  TCPRT:  216
4109  021106  000000                  UNIT:   0                       ;UNIT SELECT CODE
4110
4111  021110  000000                  TCMSK:  0
4112  021112  000000                  TCFIRST:0                       ;FIRST BLOCK TO BE SEARCHED
4113  021114  001101                  TCLAST: 1101                    ;LASTED BLOCK SEARCHED FOR
4114  021116  000000                  TCBLK:  0                       ;CURRENT BLOCK FOUND
4115  021120  000000                  TCEXPT: 0                       ;EXPECTED BLOCK
4116  021122  000000                  SEGCNT: 0
4117  021124  000101                  SAT:    101                     ;DO,STOP ALL TRANSPORTS
4118  021126  000103                  RNUM:   103                     ;DO,READ BLOCK NUMBER
4119  021130  000105                  RDAT:   105                     ;DO,READ DATA
4120  021132  000107                  RALL:   107                     ;DO,READ ALL
4121  021134  000113                  WRTM:   113                     ;DO,WRITE TIMING AND MARK TRACK
4122  021136  000115                  WDATA:  115                     ;DO,WRITE DATA
4123  021140  004103                  REVRN:  4103
4124
```

```
4125  021142  012777  021142  177732    7.6  FENDZ:  MOV     #FENDZ,@TCIV    ;VECTOR=FIND END ZONE
4126  021150  005777  177716            5.6          TST     @TCST           ;TEST FOR END ZONE
4127  021154  100404                    2.6          BMI     FEND1
4128  021156  005277  177706            6.1          INC     @TCCM           ;SET DO
4129  021162  000167  000464            4.9          JMP     TCRTI           ;NO, WAIT
4130
4131  021166  012777  021220  177706    7.6  FEND1:  MOV     #TCF1,@TCIV     ;INT VECTOR=READ ALL BLOCK #
4132  021174  042777  104000  177666    8.2          BIC     #104000,@TCCM   ;CLEAR ERROR AND REVERSE BIT
4133  021202  016767  177704  177710    7.6          MOV     TCFIRST,TCEXPT  ;INIT EXPECTED BLOCK
4134  021210  105277  177654            6.1  TCF1A:  INCB    @TCCM           ;DO
4135  021214  000167  000432            4.9          JMP     TCRTI
4136
4137  021220  032777  100200  177642    7.7  TCF1:   BIT     #100200,@TCCM   ;ANY ERROR ON READ
4138  021226  100001                    2.6          BPL     .+4
4139  021230  104000                            HLT                     ;PRINT ERROR
4140  021232  001001                    2.6          BNE     .+4             ;READY
4141  021234  104000                            HLT                     ;PRINT ERROR
4142  021236  027767  177632  177654    8.3          CMP     @TCDT,TCEXPT    ;TEST FOR CORRECT BLOCK #
4143  021244  002761                    2.6          BLT     TCF1A           ;IF BLK # LOWER THAN EXPECTED
4144  021246  001401                    2.6          BEQ     TCF2            ;NO, IS BLK #=EXPECTED
4145  021250  104000                            HLT                     ;NO, WE MISSED BLK #
4146
4147  021252  012777  021270  177622    7.6  TCF2:   MOV     #TCF3,@TCIV     ;VECTOR FOR SEQUENTIAL READS
4148  021260  105277  177604            6.1          INCB    @TCCM           ;DO
4149  021264  000167  000362            4.9          JMP     TCRTI
4150
4151  021270  032777  100200  177572    7.7  TCF3:   BIT     #100200,@TCCM   ;TEST ERROR AND READY
4152  021276  100001                    2.6          BPL     .+4
4153  021300  104000                            HLT                     ;PRINT FORWARD READ ERROR
4154  021302  001001                    2.6          BNE     .+4
4155  021304  104000                            HLT                     ;FALSE READ
4156  021306  027767  177552  177600    8.3          CMP     @TCDT,TCLAST    ;HAVE ALL BLOCK #'S BEEN READ
4157  021314  001410                    2.6          BEQ     RENDZ           ;YES, DRIVE UNIT IN END ZONE
4158  021316  005267  177576            4.9          INC     TCEXPT          ;NO, INC BLOCK #
4159  021322  027767  177546  177570    8.3          CMP     @TCDT,TCEXPT    ;IS CURRENT BLOCK CORRECT
4160  021330  001401                    2.6          BEQ     .+4
4161  021332  104000                            HLT
4162  021334  000423                    2.6          BR      TCWBK           ;TCWBK, WRITES 1 BLOCK
4163
4164                                        ;MOVE TAPE TO REVERSE
4165  021336  012777  021336  177536    7.6  RENDZ:  MOV     #RENDZ,@TCIV    ;VECTOR=REVERSE END ZONE
4166  021344  016767  177544  177546    7.6          MOV     TCLAST,TCEXPT   ;INIT FOR REVERSE SEARCH
4167  021352  005777  177514            5.6          TST     @TCST
4168  021356  100403                    2.6          BMI     REND1           ;YES, CHANGE TAPE DIRECTION
4169  021360  005277  177504            6.1          INC     @TCCM           ;DO
4170  021364  000532                    2.6          BR      TCRTI
4171  021366  016777  177546  177474    8.8  REND1:  MOV     REVRN,@TCCM     ;REVERSE AND READ BLOCK #,DO
4172  021374  012777  021454  177500    7.6          MOV     #TCR1,@TCIV     ;SET UP NEW INTERRUPT VECTRO
4173  021402  000523                    2.6          BR      TCRTI
4174
4175                                        ;WRITE FORWARD ALL BLOCKS EXCEPT 0
4176
4177  021404  012777  021436  177470    7.6  TCWBK:  MOV     #TCWB1,@TCIV    ;INTERRUPT VECTOR POINTS TO WRITE
4178  021412  012777  177400  177456    7.6          MOV     #-400,@TCWC     ;WORD COUNT=1BLOCK OF DATA
4179  021420  012777  024234  177452    7.6          MOV     #BUFF,@TCBA     ;INITIALIZE BUS ADDRESS
4180  021426  116777  177504  177434    8.8          MOVB    WDATA,@TCCM     ;WRITE DATA
```

```
 4181  021434  000506                    2.6          BR      TCRTI
 4182  021436  012777  021270  177436    7.6  TCWB1:  MOV     #TCF3,@TCIV     ;SEARCH FOR NEXT BLOCK #
 4183  021444  116777  177456  177416    8.8          MOVB    RNUM,@TCCM      ;READ BLOCK #
 4184  021452  000477                    2.6          BR      TCRTI
 4185
 4186                                               ;READ REVERSE ALL BLOCKS
 4187
 4188  021454  032777  100200  177406    7.7  TCR1:   BIT     #100200,@TCCM   ;TEST ERROR, READY
 4189  021462  100001                    2.6          BPL     .+4
 4190  021464  104000                                 HLT                     ;ERROR ON READ BLOCK REVERSE
 4191  021466  001001                    2.6          BNE     .+4
 4192  021470  104000                                 HLT                     ;FALSE INTERRUPT
 4193  021472  027767  177376  177420    8.3          CMP     @TCDT,TCEXPT    ;IS BLOCK # CORRECT
 4194  021500  001406                    2.6          BEQ     TCR2            ;YES
 4195  021502  002002                    2.6          BGE     TCR1A           ;NO, HAVE WE PASSED THE BLOCK
 4196  021504  104000                                 HLT                     ;YES
 4197  021506  000713                    2.6          BR      RENDZ           ;FIND END ZONE AND RESTART
 4198  021510  005277  177354            6.1  TCR1A:  INC     @TCCM
 4199  021514  000456                    2.6          BR      TCRTI
 4200  021516  012777  021532  177356    7.6  TCR2:   MOV     #TCR3,@TCIV     ;TEST BLOCK # ON INTERRUPT
 4201  021524  105277  177340            6.1          INCB    @TCCM
 4202  021530  000450                    2.6          BR      TCRTI
 4203
 4204                                               ;FIND SEQUENTIAL BLOCKS IN REVERSE DIRECTION
 4205
 4206  021532  032777  100200  177330    7.7  TCR3:   BIT     #100200,@TCCM   ;TEST ERROR, READY
 4207  021540  100001                    2.6          BPL     .+4
 4208  021542  104000                                 HLT                     ;ERROR, REVERSE READ
 4209
 4210  021544  001001                    2.6          BNE     .+4
 4211  021546  104000                                 HLT                     ;FALSE INTERRUPT
 4212  021550  026777  177336  177316    8.3          CMP     TCFIRST,@TCDT   ;HAVE ALL BLOCK #'S BEEN READ
 4213  021556  001002                    2.6          BNE     TCR4
 4214  021560  000167  177356            4.9          JMP     FENDZ           ;YES, ENTER FORWARD END ZONE, RESTART
 4215  021564  005367  177330            4.9  TCR4:   DEC     TCEXPT          ;NO, DEC BLOCK #
 4216  021570  027767  177300  177322    8.3          CMP     @TCDT,TCEXPT
 4217  021576  001401                    2.6          BEQ     .+4
 4218  021600  104000                                 HLT
 4219  021602  000400                    2.6          BR      TCRBK           ;READ A BLOCK
 4220
 4221                                               ;READ DATA REVERSE ALL BLOCKS EXCEPT FIRST AND LAST
 4222  021604  012777  021636  177270    7.6  TCRBK:  MOV     #TCRB1,@TCIV    ;READ ON INTERRUPT
 4223  021612  012777  177400  177256    7.6          MOV     #-400,@TCWC     ;1 BLOCK OF WORDS
 4224  021620  012777  026234  177252    7.6          MOV     #INBFTC,@TCBA   ;INIT READ BUFFER
 4225  021626  116777  177276  177234    8.8          MOVB    RDAT,@TCCM      ;READ DATA
 4226  021634  000406                    2.6          BR      TCRTI
 4227  021636  012777  021532  177236    7.6  TCRB1:  MOV     #TCR3,@TCIV     ;BLOCK SEARCH
 4228  021644  116777  177256  177216    8.8          MOVB    RNUM,@TCCM      ;READ NUMBER
 4229  021652  052767  000001  157424    6.4  TCRTI:  BIS     #FL.ANC,RU.MAP
 4230  021660  052767  000004  157420    6.4          BIS     #FL.TC,RU.ANC
 4231  021666  000002                    4.8          RTI
 4232
 4233                                               ;RF11 DISK EXERCISER SECTION
 4234
 4235  021670  177460                               DCS:    177460          ;DISK CONTROL REGISTER
 4236  021672  177462                               WC:     177462          ;WORD COUNT REGISTER
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 4237  021674  177464                          CMA:    177464                  ;CURRENT MEMORY ADDRESS REGISTER
 4238  021676  177466                          DAR:    177466                  ;DSK ADRS REG (LOW 16 BITS)
 4239  021700  177470                          DAE:    177470                  ;DSK ADRS EXT AND ERR REGISTER
 4240  021702  177472                          DBR:    177472                  ;DATA BUFFER REGISTER
 4241  021704  177474                          MAR:    177474                  ;MAINTENANCE REGISTER
 4242  021706  177476                          ADS:    177476                  ;ADRS OF DSK SEGMENT REG
 4243  021710  000000                          SERV:   0                       ;SERVICE QUEUE
 4244  021712  000000                          LOWADR: 0                       ;LSB'S OF RF11 DISK ADDRESS
 4245  021714  000000                          UPADRS: 0                       ;MSB'S OF RF11 DISK ADDRESS
 4246  021716  000003                                  RFLIM:  3               ;UPPER LIMIT, 256K FOR ONE DISK
 4247
 4248                                                  ;
 4249                                                  ;DISK ADDRESS EXTENTION BITS
 4250                                                  ;BIT0=TA05              ;TRACK ADRS BIT5
 4251                                                  ;BIT1=TA06
 4252                                                  ;BIT2=DA00              ;DISK ADRS BIT00
 4253                                                  ;BIT3=DA01
 4254                                                  ;BIT4=DA02
 4255                                                  ;BIT5=DA03
 4256                                                  ;
 4257                                                  ;
 4258                                                  ;RF11 INTERRUPT ENTRY POINT
 4259                                                  ;DETERMINE FUNCTION TO PERFORM.
 4260                                                  ;WRITE, WRITE CHEC, READ
 4261                                                  ;
 4262
 4263  021720  005767  177764                  4.4  RFISR:  TST     SERV
 4264  021724  001412                          2.6          BEQ     WRITE
 4265  021726  032767  000001  177754          6.5          BIT     #1,SERV
 4266  021734  001054                          2.6          BNE     WRTCHK
 4267  021736  032767  000002  177744          6.5          BIT     #2,SERV
 4268  021744  001116                          2.6          BNE     READ
 4269  021746  104000                                       HLT                     ;DISK EMULATOR
 4270  021750  000000                          1.8          HALT
 4271                                                  ;
 4272                                                  ;WRITE 256 WORDS ON DISK
 4273                                                  ;
 4274
 4275  021752  005777  177712                  5.6  WRITE:  TST     @DCS            ;ERROR
 4276  021756  100001                          2.6          BPL     .+4             ;NO, SERVICE INTERRUPT
 4277  021760  104000                                       HLT                     ;YES, REPORT ERROR
 4278  021762  052777  000400  177700          7.6          BIS     #400,@DCS       ;BIT8, DISK CLEAR
 4279  021770  012777  024234  177676          7.6          MOV     #BUFF,@CMA      ;INITIALIZE CURRENT ADDRESS
 4280  021776  012777  177400  177666          7.6          MOV     #-400,@WC       ;WORD COUNT = 400(8)
 4281  022004  016777  177702  177664          8.8          MOV     LOWADR,@DAR     ;INIT DSK ADRS (16 LOW BITS)
 4282  022012  016777  177676  177660          8.8          MOV     UPADRS,@DAE     ;INIT DSK ADRS (EXT)
 4283  022020  052777  000103  177642          7.6          BIS     #103,@DCS       ;INT ENB, WRITE, GO
 4284  022026  062767  000430  177656          6.4          ADD     #430,LOWADR     ;INC DISK ADRS BY 430
 4285  022034  005567  177654                  4.9          ADC     UPADRS          ;ADD CARRY TO MSB'S
 4286  022040  026767  177652  177646          7.1          CMP     RFLIM,UPADRS    ;TEST FOR UPPER LIMIT, 256K
 4287  022046  001122                          2.6          BNE     RFRTI           ;NO, RTI
 4288  022050  005067  177636                  4.9          CLR     LOWADR          ;YES, CLEAR ADDRESS
 4289  022054  005267  177630                  4.9          INC     SERV            ;INC SERVICE COUNT TO NEXT FUNCTION
 4290  022060  005067  177630                  4.9          CLR     UPADRS          ;YES.
 4291  022064  000513                          2.6          BR      RFRTI
 4292                                                  ;
```

```
                                                        ;WRITE CHECK 256 WORDS ON DSK
                                                        ;
022066  005777  177576          5.6   WRTCHK: TST     @DCS            ;ERROR
022072  100001                  2.6           BPL     .+4             ;NO
022074  104000                                HLT                     ;YES, REPORT ERROR
022076  052777  000400  177564  7.6           BIS     #400,@DCS       ;DISK CLEAR
022104  012777  024234  177562  7.6           MOV     #BUFF,@CMA      ;INITIALIZE CURRENT ADDRESS
022112  012777  177400  177552  7.6           MOV     #-400,@WC       ;WORD COUNT = 400(8)
022120  016777  177566  177550  8.8           MOV     LOWADR,@DAR
022126  016777  177562  177544  8.8           MOV     UPADRS,@DAE
022134  052777  000107  177526  7.6           BIS     #107,@DCS       ;INT ENB, WRITE CHECK, GO
022142  062767  000430  177542  6.4           ADD     #430,LOWADR     ;INC DISK ADRS BY 430
022150  005567  177540          4.9           ADC     UPADRS          ;ADD CARRY TO MSB'S
022154  026767  177536  177532  7.1           CMP     RFLIM,UPADRS    ;TEST FOR UPPER LIMIT, 256K
022162  001054                  2.6           BNE     RFRTI           ;NO, RTI
022164  005067  177522          4.9           CLR     LOWADR          ;YES, CLEAR ADDRESS
022170  005267  177514          4.9           INC     SERV            ;INC SERVICE COUNT TO NEXT FUNCTION
022174  005067  177514          4.9           CLR     UPADRS          ;YES,
022200  000445                  2.6           BR      RFRTI
                                              ;
                                              ;READ 256 WORDS FROM DISK
                                              ;
022202  005777  177462          5.6   READ:   TST     @DCS            ;ERROR
022206  100001                  2.6           BPL     .+4             ;NO
022210  104000                                HLT                     ;YES, REPORT ERROR
022212  052777  000400  177450  7.6           BIS     #400,@DCS       ;DISK CLEAR
022220  012777  025234  177446  7.6           MOV     #INBFRF,@CMA    ;INITIALIZE MEMORY ADDRESS
022226  012777  177400  177436  7.6           MOV     #-400,@WC
022234  016777  177452  177434  8.8           MOV     LOWADP @DAR
022242  016777  177446  177430  8.8           MOV     UPADRS,@DAE
022250  052777  000105  177412  7.6           BIS     #105,@DCS       ;INT ENB. WRITE
022256  062767  000430  177426  6.4           ADD     #430,LOWADR     ;INC DISK ADRS BY 430
022264  005567  177424          4.9           ADC     UPADRS          ;ADD CARRY TO MSB'S
022270  026767  177422  177416  7.1           CMP     RFLIM,UPADRS    ;TEST FOR UPPER LIMIT, 256K
022276  001006                  2.6           BNE     RFRTI           ;NO, RTI
022300  005067  177404          4.9           CLR     SERV            ;FUNCTION = WRITE
022304  005067  177402          4.9           CLR     LOWADR          ;YES, CLEAR ADDRESS
022310  005067  177400          4.9           CLR     UPADRS          ;YES
022314  052767  000001  156762  6.4   RFRTI:  BIS     #FL.ANC,RU.MAP
022322  052767  000010  156756  6.4           BIS     #FL.RF,RU.ANC
022330  000002                  4.8           RTI
                                              ;********************** RK11*****************************
                                              ;177400                 ;DRIVE STATUS
                                              ;177402                 ;MAINTENANCE REG
022332  177400                  RKDS:   177400          ;DRIVE STATUS REGISTER
022334  177413                  RKDAH:  177413          ;HIGH BYTE DISK ADRS
022336  177412                  RKDAE:  177412          ;DISK ADRS
022340  177416                  RKDBR:  177416          ;DATA BUFFER REG
022342  177412                  RKDAR:  177412          ;DISK ADRS REG
022344  177406                  RKWC:   177406          ;WORD COUNT REG
022346  177410                  RKBAR:  177410          ;CURRENT ADRS REG
022350  177404                  RKCSR:  177404          ;STATUS REG
022352  177405                  RKCSRH: 177405          ;HIGH BYTE ADRS OF CSR
```

```
4349
4350  022354  000240                          1.5  RKSTART:        NOP
4351  022356  012777  000000  177752          7.6                  MOV     #0,@RKDAE       ;INIT DISK DAR-DAE
4352  022364  016777  000124  177754          8.8  RK1:            MOV     LLIMIT,@RKBAR   ;DATA BASE
4353  022372  016777  000114  177744          8.8                  MOV     RKWORDCT,@RKWC  ;LENGTH OF TRANSFER
4354  022400  116777  000104  177742          8.8                  MOVB    RKFUNCTION,@RKCSR ;WRITE OR WRITE CHECK TO DISK
4355  022406  052767  000001  156670          6.4                  BIS     #FL.ANC,RU.MAP
4356  022414  052767  000020  156664          6.4                  BIS     #FL.RK,RU.ANC
4357  022422  000002                          4.8                  RTI
4358  022424  105777  177720                  5.6  RKISR:          TSTB    @RKCSR          ;READY?
4359  022430  100402                          2.6                  BMI     .+6
4360  022432  104000                                               HLT
4361  022434  000747                          2.6                  BR      RKSTART
4362  022436  005777  177702                  5.6                  TST     @RKWC           ;IS WORD COUNT ZERO
4363  022442  001402                          2.6                  BEQ     .+6
4364  022444  104000                                               HLT                     ;
4365  022446  000742                          2.6                  BR      RKSTART
4366  022450  005777  177674                  5.6                  TST     @RKCSR
4367  022454  100002                          2.6                  BPL     .+6
4368  022456  104000                                               HLT                     ;RK11 ERROR FLAG
4369  022460  000735                          2.6                  BR      RKSTART
4370  022462  032777  000037  177646          7.7                  BIT     #37,@RKDAE      ;DISK AT UPPER LIMIT
4371  022470  001335                          2.6                  BNE     RK1             ;NO
4372  022472  122777  000031  177634          7.1                  CMPB    #31,@RKDAH      ;
4373  022500  001331                          2.6                  BNE     RK1
4374  022502  000367  000002                  4.9                  SWAB    RKFUNCTION      ;CHANG COMMAND
4375  022506  000722                          2.6                  BR      RKSTART
4376  022510  000000                                  RKFUNCTION:  0                       ;DISK COMMAND
4377  022512  177400                                  RKWORDCT:    -400                    ;WORD COUNT
4378  022514  024234                                  LLIMIT:      BUFF                    ;BEGINING OF DATA FILE
4379
4380                                          ;*************************************************************************
4381                                          ;RP11 DISK SERVICE ROUTINE
4382  022516  176722                          RPCA:    176722                             ;RF11 CYLINDER ADDRESS DISK
4383  022520  176725                          RPDAH:   176725                             ;RP11 HIGH BYTE OF DISK ADDRESS
4384  022522  176710                          RPDSR:   176710                             ;RP11 DRIVE STATUS REGISTER
4385  022524  176724                          RPDAR:   176724                             ;RP11 DISK ADDRESS REGISTER
4386  022526  176716                          RPWC:    176716                             ;RP11 WORD COUNT REGISTER
4387  022530  176720                          RPBAR:   176720                             ;RP11 CURRENT ADDRESS REGISTER
4388  022532  176714                          RPCSR:   176714                             ;RP11 STATUS REGISTER
4389  022534  176715                          RPCSRH:  176715                             ;RP11 HIGH BYTE ADDRESS OF CSR
4390  022536  105777  177770          5.6     RPISR:   TSTB    @RPCSR                     ;INTERRUPT VECTOR POINTS HERE
4391  022542  100402                  2.6              BMI     .+6
4392  022544  104000                                   HLT                                ;RP11 READY NOT UP
4393  022546  000425                  2.6              BR      RPSTART
4394  022550  005777  177756          5.6              TST     @RPCSR
4395  022554  100014                  2.6              BPL     RPX
4396
4397  022556  016700  177740          5.0              MOV     RPDSR,R0                   ;DEVICE STATUS REG ADDRESS > R0
4398  022562  017701  177734          6.2              MOV     @RPDSR,R1                  ;CONTENTS OF STATUS REG    > R1
4399  022566  016702  177736          5.0              MOV     RPBAR,R2                   ;DEVICE CURRENT ADD REG    > R2
4400  022572  017703  177732          6.2              MOV     @RPBAR,R3                  ;CONTENTS OF ADD REG       > R3
4401  022576  017704  177730          6.2              MOV     @RPCSR,R4                  ;CONTENTS OF STATUS REG    > R4
4402                                          ;NOTE:
4403                                          ;       CHANGE HLT TO HLT+4 (104000 = 104004)
4404                                          ;       TO DISPLAY CONTENTS OF REGISTERS SPECIFIED
```

```
4405                                                    :       ABOVE ON EXTENDED ERROR DISPLAY
4406
4407  022602  104000                                            HLT                     ;RP-11 ERROR FLAG UP
4408  022604  000406                              2.6           BR      RPSTART
4409  022606  122777  000312  177702             7.1   RPX:    CMPB    #312,@RPCA      ;CYLINDER NO. 312
4410  022614  001010                              2.6           BNE     RP1             ;NO
4411  022616  000367  000056                      4.9           SWAB    RPFUNCTION      ;CHANGE COMMAND
4412  022622  012777  000001  177702             7.6   RPSTART:MOV     #00001,@RPCSR   ;INITIALIZE DISK - DAR-DAE
4413
4414  022630  105777  177676                      5.6   RP0:    TSTB    @RPCSR          ;TEST CONTROLLER READY
4415  022634  100375                              2.6           BPL     RP0             ;NO WAIT
4416                                                    ;NOTE:
4417                                                    ;       PROGRAM LOOP (HUNG) ON RP0 NO CONTROLLER READY RESPONSE
4418                                                    ;       RUN DEVICE DIAGNOSTICS
4419
4420  022636  016777  177652  177664             8.8   RP1:    MOV     LLIMIT,@RPBAR   ;INITIAL CORE ADDRESS
4421  022644  016777  000026  177654             8.8           MOV     RPWORDCT,@RPWC  ;LENGTH OF TRANSFER
4422  022652  116777  000022  177652             8.8           MOVB    RPFUNCTION,@RPCSR ;WRITE OR WRITE CHECK TO DISK
4423  022660  052767  000001  156416             6.4           BIS     #FL.ANC,RU.MAP
4424  022666  052767  000040  156412             6.4           BIS     #FL.RP,RU.ANC
4425  022674  000002                              4.8           RTI                     ;RETURN TO MAINLINE CODE
4426  022676  176000                                    RPWORD: -2000
4427  022700  000000                                    RPFUNC: 0
```

```
4428
4429                                        ;SCRATCH PAD AND CONSTANTS
4430
4431  022702  000101                        LIMIT:  101                     ;HIGH LIMIT OF DISK DATA
4432  022704  000000                        FSEG:   0                       ;SEGMENT COUNT (1/2 OF A FILE
4433  022706  000001                        FDATA:  1                       ;FILE DATA
4434  022710  000000                        DFILE:  0                       ;DATA FILE
4435  022712  000001                        ONE:    1
4436  022714  000000                        DACNT:  0                       ;BASE DATA INITIALIZATION COUNT
4437  022716  000000                        CNT:    0                       ;TTY INITIALIZATION VECTOR
4438  022720  000000                        PUNCNT: 0                       ;PUNCH INTERROGATION COUNT
4439  022722  000000                        RDRCNT: 0                       ;READER INTERROGATION COUNT
4440  022724  000000                        ACTVOC: 0                       ;ACTIVE DATA SETS
4441  022726  000000                        SAVPC:  0                       ;SAVE PC
4442  022730  000000                        SAVPS:  0                       ;SAVE PROCESSOR STATUS
4443  022732  000000                        SAVR2:  0                       ;SAVE R2 FOR ERROR PRINT
4444  022734  000000                        SAVR3:  0                       ;SAVE R3 FOR ERROR PRINT
4445  022736  000000                        SAVR4:  0                       ;SAVE R4 FOR ERROR PRINT
4446  022740  000000                        EMASK:  0                       ;EMULATOR MASK
4447  022742  000000                        STOR0:  0                       ;STORE R0
4448  022744  000000                        STOR1:  0                       ;STORE R1
4449  022746  000000                        STOR2:  0                       ;STORE R2
4450  022750  000000                        STOR3:  0
4451  022752  000000                        STOR4:  0
4452  022754  000000                        STOR5:  0
4453  022756  000000                        STOR6:  0                       ;STORE R6
4454  022760  000000                        TMPDAT: 0
4455  022762  000300                        STOPLT: 0                       ;STORE EMULATOR NUMBER
4456
4457  022764  000000                        MAX:    0                       ;MAX # OF DEVICE
4458  022766  000000                        MARK:   0                       ;DEVICE MARKER;
4459
4460                                        ;DEVICE PRIORITY TABLE
4461
4462  022770  000000                        LINE:   0                       ;STORAGE FOR LINE NUMBER
4463  022772  000000                        TERTMP: 0
4464
4465                                        ;DEVICE ADDRESSES
4466
4467  022774  176504                        KLXSO:  176504
4468  022776  176500                        KLADRS: 176500                  ;FIRST MULTI-USER KL11 ADDRESS
4469  023000  176500                        KLRSO:  176500
4470  023002  174000                        DCADRS: 174000                  ;ADDRESS ASSIGNED TO FIRST DC11
4471  023004  174770                        DPADRS: 174770                  ;ADDRESS ASSIGNED TO FIRST DP11
4472  023006  175000                        DMADRS: 175000                  ;FIRST DM11 ADRS
4473  023010  175200                        DNADRS: 175200                  ;FIRST DN11 ADRS
4474  023012  177560                        CTKS:   177560
4475  023014  177562                        CTKB:   177562
4476  023016  177564                        CTPS:   177564
4477  023020  177566                        CTPB:   177566
4478  023022  177342                        TC11:   177342                  ;TC11 ADRESS
4479  023024  177460                        RF11.   177460                  ;RF11 ADDRESS
4480  023026  177514                        LP11:   177514                  ;LP11 ADDRESS
4481
4482  023030  000000                        NDCS:   0                       ;NUMBER OF DC11'S
4483  023032  000000                        NKLS:   0                       ;NUMBER OF KL11'S
```

```
4484  023034  000000                    NUPS:   0       ;NUMBER OF DP11'S
4485  023036  000000                    NDMS:   0       ;NUMBER OF DM'S
4486  023040  000000                    NDNS:   0       ;NUMBER OF DN'S
4487  023042  000000                    ANCMAP: 0       ;MAP OF NON-COM ANCILLARIES
4488  023044  000000                    DEVCNT: 0       ;DEVICE COUNT
```

```
4489
4490                                        ;THIS CALL CLEARS CORE BETWEEN THE ADDRESS LISTED
4491                                        ;AFTER THE CALL AND THE NUMBER OF WORDS SPECIFIED
4492
4493  023046                                CLEAR:
4494  023046  004767  000072          7.0           JSR     PC,     SAVRG   ;SAVE R0-R4
4495  023052  012501                    3.8           MOV     (R5)+,R1        ;FETCH ADRS OF FIRST WORD TO BE CLEARED
4496  023054  012502                    3.8           MOV     (R5)+,R2        ;FETCH WORD COUNT
4497  023056  005021                    3.7   CLR1:   CLR     (R1)+           ;CLEAR MEMORY
4498  023060  005302                    2.3           DEC     R2              ;DEC WORD COUNT
4499  023062  001375                    2.6           BNE     CLR1            ;BRANCH IF AREA NOT CLEARED
4500  023064  004767  000076          7.0           JSR     PC,     RSTRG   ;RESTORE R0-R4
4501  023070  000205                    3.5           RTS     %5              ;RETURN
4502
4503  023072  012700  000016          3.8   REPORT: MOV     #MAPSIZ-1,R0
4504  023076  012767  030052  000012  6.4           MOV     #MSGMAP,2$      ;SET UP MESSAGE POINTER
4505  023104  005711                    3.2   1$:     TST     (R1)            ;CHECK FOR ANY DEVICES
4506  023106  001407                    2.6           BEQ     3$              ;BRANCH IF NONE
4507  023110  000004  027634                          TYPE,   RETURN
4508  023114  000004                                  TYPE
4509  023116  000000                          2$:     0
4510  023120  011105                    3.8           MOV     (R1),TTY        ;PUT (R1) INTO TTY
4511  023122  004767  000430          7.0           JSR     PC,BITYP$       ;TYPE (R1) IN BITS
4512  023126  005721                    3.2   3$:     TST     (R1)+           ;UPDATE POINTER
4513  023130  062767  000020  177760  6.4           ADD     #20,    2$      ;UPDATE MESSAGE POINTER
4514  023136  005300                    2.3           DEC     R0              ;DONE?
4515  023140  001361                    2.6           BNE     1$              ;BRANCH IF NOT
4516  023142  000207                    3.5           RTS PC
4517
4518                                        ;SAVE REGS 0 TO 4 SUBROUTINE.
4519  023144  012667  000014          6.4   SAVRG:  MOV     (6)+,   SVRPC   ;SAVE PC
4520  023150  010446                    4.9           MOV     %4,     -(6)    ;SAVE REGS 0 - 4
4521  023152  010346                    4.9           MOV     %3,     -(6)    ;IN STACK.
4522  023154  010246                    4.9           MOV     %2,     -(6)
4523  023156  010146                    4.9           MOV     %1,     -(6)
4524  023160  010046                    4.9           MOV     %0,     -(6)
4525  023162  000137                    3.7           JMP     @(7)+           ;SIMULATE RTS PC
4526  023164  000000                          SVRPC:  0
4527
4528                                        ;RESTORE REGS 0 TO 4 SUBROUTINE.
4529  023166  012667  000014          6.4   RSTRG:  MOV     (6)+,   RSTPC   ;SAVE PC
4530  023172  012600                    3.8           MOV     (6)+,   %0      ;RESTORE REGS 0 - 4
4531  023174  012601                    3.8           MOV     (6)+,   %1      ;FROM STACK.
4532  023176  012602                    3.8           MOV     (6)+,   %2
4533  023200  012603                    3.8           MOV     (6)+,   %3
4534  023202  012604                    3.8           MOV     (6)+,   %4
4535
4536  023204  000137                    3.7           JMP     @(7)+           ;SIMULATE RTS PC
4537  023206  000000                          RSTPC:  0
```

```
4538
4539  023210  011646                    6.4  HLT$:  MOV     (6),    -(6)     ;DUP RETURN ADDR
4540  023212  162716  000002            5.2         SUB     #2,     (6)      ;POINT TO EMT
4541  023216  117667  000000  000222    8.8         MOVB    @(6),   HLTAD$   ;SAVE HALT ARG
4542  023224  012737  000340  000022    5.2         MOV     #340,   @#22     ;DEFER FURTHER PRINTOUT
4543  023232  032737  002000  177570    5.3         BIT     #SW10,@#SWR      ;BELL ON ERROR?
4544  023240  001406                    2.6         BEQ     1$               ;NO - SKIP
4545  023242  004767  167334            7.0         JSR     PC,     CTYDWN
4546  023246  000004  000207                        TYPE    ,BELL            ;TYPE THE CHARACTER BELL
4547  023252  004767  167356            7.0         JSR     PC,     CTYUP
4548  023256  032737  020000  177570    5.3  1$:    BIT     #SW13,@#SWR      ;SKIP TYPEOUT IF SET
4549  023264  001044                    2.6         BNE     5$               ;SKIP TYPEOUTS
4550  023266  005767  155710            4.4         TST     ERRORS
4551  023272  001002                    2.6         BNE     2$
4552  023274  000004  027775                        TYPE    ,MSGHED
4553  023300  000004  027634                 2$:    TYPE    ,RETURN
4554  023304  012605                    3.8         MOV     (6)+,TTY         ;TYPE (6)+ IN OCTAL
4555  023306  004767  000254            7.0         JSR     PC,PRINTR        ;TYPE LEADING ZERO'S
4556  023312  000004  027642                        TYPE    ,SPACE+3
4557  023316  016605  000002            5.0         MOV     2(6),TTY         ;TYPE 2(6) IN OCTAL
4558  023322  004767  000250            7.0         JSR     PC,PRINTS        ;AND SUPRESS LEADING ZERO'S
4559  023326  000004  027642                        TYPE,   SPACE+3
4560  023332  010605                    2.3         MOV     R6,TTY           ;TYPE R6 IN OCTAL
4561  023334  004767  000236            7.0         JSR     PC,PRINTS        ;AND SUPRESS LEADING ZERO'S
4562  023340  042767  007700  000020    7.0         BIC     #7700,4$
4563  023346  105367  000074            4.9  3$:    DECB    HLTAD$
4564  023352  100411                    2.6         BMI     5$
4565  023354  000004  027642                        TYPE,   SPACE+3
4566  023360  062767  000100  000000    6.4         ADD     #100,   4$
4567  023366                                 4$:
4568  023366  010105                    2.3         MOV     R1,TTY           ;TYPE R1 IN OCTAL
4569  023370  004767  000172            7.0         JSR     PC,PRINTR        ;TYPE LEADING ZERO'S
4570  023374  000764                    2.6         BR      3$
4571  023376  005737  177570            3.2  5$:    TST     @#SWR            ;HALT ON ERROR
4572  023402  100001                    2.6         BPL     .+4              ;SKIP IF CONTINUE
4573  023404  000000                    1.8         HALT                     ;HALT ON ERROR!
4574  023406  005267  155570            4.9         INC     ERRORS           ;INC THE ERROR COUNT
4575  023412  032737  020000  177570    5.3         BIT     #SW13,@#SWR      ;TEST SUPPRESS TYPEOUT
4576  023420  001003                    2.6         BNE     6$               ;YES BRANCHES
4577  023422  000004  023426                        TYPE,   .+2
4578  023426  000377                                .ASCIZ  <377>
4579
4580  023430  000005                    1.5  6$:    RESET                    ;CLEAR OUT THE WORLD
4581  023432  005037  000022            3.7         CLR     @#22             ;ALLOW FURTHER PRINTOUT
4582  023436  012706  001200            3.8         MOV     #1200,  SP       ;RESET STACK POINTER
4583  023442  000167  156404            4.9         JMP     DVICE            ;RESTART EVERYTHING
4584
4585  023446  000000                         HLTAD$: 0
4586
4587                                         ;       $TYPE           MESSAGE TYPEOUT ROUTINE
4588
4589                                         ;THIS ROUTINE IS USE TO TYPE ASCII MESSAGES ON THE TTY. THE
4590                                         ;CALL CAN BE IN ONE OF 3 FORMS: 1) "TYPE ,ADR" - TYPES THE
4591                                         ;MESSAGE STARTIN IN LOCATION "ADR:", 2) "TYPE ,CHAR" - TYPES
4592                                         ;THE ASCII "CHAR", AND 3) "PRINT <<15><12>"MESSAGE"> - TYPES
4593                                         ;THE MESSAGE WHICH IS INLINE ASCII.
```

```
4594
4595  023450  010546                          4.9  IOT$:   MOV     TTY,-(6)        ;SAVE TTY
4596  023452  017605  000002                  6.2          MOV     @2(6),TTY       ;GET ADDRESS TO BE TYPED
4597  023456  032705  177400                  4.4          BIT     #177400,TTY     ;IS IT A TYPEM?
4598  023462  001004                          2.6          BNE     1$              ;NO
4599  023464  010567  000064                  4.9          MOV     TTY,.TYPE       ;GET THE CHARACTER
4600  023470  012705  023554                  3.8          MOV     #.TYPE,TTY      ;FUDGE THE ADDRESS
4601  023474  105715                          3.2  1$:     TSTB    (TTY)           ;TERMINATOR?
4602  023476  001406                          2.6          BEQ     2$              ;GET OUT IF SO
4603  023500  112537  177566                  5.2          MOVB    (TTY)+,@#177566 ;LOAD AND TYPE THE CHARACTER
4604  023504  105737  177564                  3.2          TSTB    @#177564        ;IS THE PRINTER READY
4605  023510  100375                          2.6          BPL     .-4             ;WAIT UNTIL IT IS
4606  023512  000770                          2.6          BR      1$              ;GET THE NEXT CHARACTER
4607  023514  017646  000002                  8.8  2$:     MOV     @2(6),-(6)      ;GET ADDRESS TO BE TYPED
4608  023520  062766  000002  000004          6.4          ADD     #2,4(6)         ;ADD 2 TO THE ADDRESS
4609  023526  022666  000002                  5.9          CMP     (6)+,2(6)       ;IS IT .+2?
4610  023532  001006                          2.6          BNE     3$              ;NO
4611  023534  062705  000002                  3.8          ADD     #2,TTY          ;ADD 2 TO THE ADDRESS
4612  023540  042705  000001                  4.4          BIC     #1,TTY          ;BACK UP TO AN EVEN BYTE
4613  023544  010566  000002                  4.9          MOV     TTY,2(6)        ;RESTORE ADDRESS
4614  023550  012605                          3.8  3$:     MOV     (6)+,TTY        ;RESTORE TTY
4615  023552  000002                          4.8          RTI                     ;RETURN
4616  023554  000000                               .TYPE:  0                       ;CHARACTER TYPE LOCATION
```

```
 4617                                                   ;       $OCTAL          OCTAL TYPEOUT ROUTINE
 4618
 4619                                                   ;THIS ROUTINE IS USED TO TYPE AN OCTAL NUMBER ON THE TTY. IT WILL TYPE
 4620                                                   ;ALL 6 CHARACTERS, SUPPRESS LEADING ZEROES, TYPE AN 18 BIT ADDRESS, OR T.PE
 4621                                                   ;THE 16 BITS. IT IS CALLED VIA THE DUMP, SDUMP, DUMP18, OR BITYPE MACRO'S.
 4622
 4623  023556  012767  170101  000140      6.4  BITYP$: MOV     #170101,.PR     ;SET BIT FLAG ANS 16. CHARACTER COUNT
 4624  023564  000411                        2.6         BR      .PTIT           ;NOW TYPE IT IN BIT FORM
 4625  023566  112767  000001  000130      6.4  PRINTR: MOVB    #1,.PR          ;SET ZERO FILL SWITCH
 4626  023574  000402                        2.6         BR      .+6             ;SKIP
 4627  023576  005067  000122              4.9  PRINTS: CLR     .PR             ;SUPRESS LEADING ZERO'S
 4628  023602  112767  177772  000115      6.4         MOVB    #-6,.PR+1       ;SET COUNT
 4629  023610  010446                        4.9  .PTIT:  MOV     R4,-(6)         ;SAVE R4
 4630  023612  012704  023726              3.8         MOV     #.PR+2,R4       ;SET POINTER TO FIRST ASCII CHAR.
 4631  023616  105014                        3.7         CLRB    (4)             ;CLEAR FIRST BYTE
 4632  023620  000411                        2.6         BR      .PRF            ;ROTATE FIRST BIT
 4633  023622  105014                        3.7  .PRL:   CLRB    (4)             ;CLEAR BYTE OF CHARACTER
 4634  023624  032767  000100  000072      6.5         BIT     #100,.PR        ;BIT TYPING MODE?
 4635  023632  001004                        2.6         BNE     .PRF            ;YES - SKIP 2 ROTATES
 4636  023634  006105                        2.3         ROL     TTY             ;ROTATE BIT INTO C
 4637  023636  106114                        3.7         ROLB    (4)             ;PACK IT
 4638  023640  006105                        2.3         ROL     TTY             ;ROTATE BIT INTO C
 4639  023642  106114                        3.7         ROLB    (4)             ;PACK IT
 4640  023644  006105                        2.3  .PRF:   ROL     TTY             ;ROTATE BIT INTO C
 4641  023646  106114                        3.7         ROLB    (4)             ;PACK IT
 4642  023650  105714                        3.2         TSTB    (4)             ;IS IT ZERO?
 4643  023652  001402                        2.6         BEQ     .+6             ;SKIP INC
 4644  023654  105267  000044              4.9         INCB    .PR             ;SET FILL SWITCH
 4645  023660  105767  000040              4.4         TSTB    .PR             ;CHECK FILL SWITCH
 4646  023664  001402                        2.6         BEQ     .+6             ;SKIP BITSET
 4647  023666  152724  000060              5.2         BISB    #'0,(4)+        ;MAKE INTO ASCII CHAR
 4648  023672  105267  000027              4.9         INCB    .PR+1           ;INC COUNT
 4649  023676  001351                        2.6         BNE     .PRL            ;REPEAT
 4650  023700  022704  023726              3.8         CMP     #.PR+2,R4       ;EMPTY BUFFER?
 4651  023704  001002                        2.6         BNE     .+6             ;SKIP IF NOT
 4652  023706  112724  000060              5.2         MOVB    #'0,(4)+        ;LOAD 1 ZERO
 4653  023712  105014                        3.7         CLRB    (4)             ;NULL TERMINATOR
 4654  023714  000004  023726                            TYPE    .PR+2           ;TYPE IT
 4655  023720  012604                        3.8         MOV     (6)+,R4         ;RESTORE R4
 4656  023722  000207                        3.5         RTS     PC              ;RETURN
 4657  023724  000012                              .PR:  .BLKW   12              ;COUNT, SWITCH, AND OUTPUT BUFFER
 4658
```

```
                                                ;       $SCOPE          SCOPE LOOP HANDLER
                                                ;
                                                ;THIS ROUTINE HANDLES THE ITERATIONS, LOOPING, ERROR
                                                ;LOOPING, AND THE DISPLAYING OF THE TEST NUMBER.
                                                ;
                                                ;"SCOPE" IS PLACED BETWEEN EACH SUBTEST IN THE TEST AND
                                                ;RECORDS THE STARTING ADDRESS OF THE SUBTEST IN "LAD:"
                                                ;
024750  005737  001024          3.2   TRAP$:  TST     @#1024          ;CHECK MONITOR CONTROL
024754  001022                  2.6           BNE     SVLAD$          ;(ACTIVE) QUICK ITERATIONS
024756  032737  040000  177570  5.3           BIT     #SW14,@#SWR     ;LOOP ON TEST?
024764  001026                  2.6           BNE     KIT$            ;LOOP ON TEST IS SET
024766  032737  004000  177570  5.3           BIT     #SW11,@#SWR     ;KILL ITERATIONS
024774  001012                  2.6           BNE     SVLAD$          ;YES - KILL ITERATIONS
024776  105767  155177          4.4           TSTB    ICNT+1          ;FIRST ONE?
025002  001404                  2.6           BEQ     2$              ;BRANCH IF FIRST
025004  126767  000062  155167  7.1           CMPB    TIMES,ICNT+1    ;DONE?
025012  001013                  2.6           BNE     KIT$            ;BRANCH IF NOT
025014  112767  000001  155157  6.4   2$:     MOVB    #1,ICNT+1       ;FIRST ITERATION
025022  105267  155152          4.9   SVLAD$: INCB    ICNT            ;COUNT TEST NUMBERS
025026  011667  000036          6.4           MOV     (6),LAD         ;SAVE LOOP ADDRESS
025032  016737  155142  177570  6.4           MOV     ICNT,@#DISPLAY  ;DISPLAY TEST NO. AND ITERATION COUNT
025040  000002                  4.8           RTI                     ;RETURN
                                                ;
025042  105267  155133          4.9   KIT$:   INCB    ICNT+1          ;INC THE ITERATION COUNT
025046  016737  155126  177570  6.4   OVER$:  MOV     ICNT,@#DISPLAY  ;SET UP DISPLAY
025054  005767  000010          4.4           TST     LAD             ;FIRST ONE?
025060  001760                  2.6           BEQ     SVLAD$          ;YES
025062  016716  000002          6.4           MOV     LAD,(6)         ;FUDGE RETURN ADDRESS
025066  000002                  4.8           RTI                     ;FIXES PS
                                                ;
025070  000000                        LAD:    0                       ;LOOP ADDRESS
025072  000377                        TIMES:  377                     ;RUN 377 TIMES
```

```
 4692  024074  012777  024222  000126      7.6  PDOWN$:  MOV     #ILLUP,@PUVEC$  ;SET FOR FAST UP
 4693  024102  012777  000340  000122      7.6           MOV     #340,@PUVEC$+2  ;PRIO:7
 4694  024110  010046                      4.9           MOV     R0,-(6)         ;PUSH R0 ON STACK
 4695  024112  010146                      4.9           MOV     R1,-(6)         ;PUSH R1 ON STACK
 4696  024114  010246                      4.9           MOV     R2,-(6)         ;PUSH R2 ON STACK
 4697  024116  010346                      4.9           MOV     R3,-(6)         ;PUSH R3 ON STACK
 4698  024120  010446                      4.9           MOV     R4,-(6)         ;PUSH R4 ON STACK
 4699  024122  010546                      4.9           MOV     R5,-(6)         ;PUSH R5 ON STACK
 4700  024124  010667  000076              4.9           MOV     SP,.SAVR6       ;SAVE SP
 4701  024130  012777  024140  000072      7.6           MOV     #PUP$,@PUVEC$   ;SET UP VECTOR
 4702  024136  000000                      1.8           HALT                    ;WAIT FOR PF
 4703
 4704  024140  016706  000062              5.0  PUP$:    MOV     .SAVR6,SP       ;GET SP
 4705  024144  005001                      2.3           CLR     R1              ;WAIT LOOP FOR THE TTY
 4706  024146  005201                      2.3  1$:      INC     R1              ;WAIT FOR THE INC
 4707  024150  001376                      2.5           BNE     1$              ;OF  WORD
 4708  024152  012605                      3.8           MOV     (6)+,R5         ;POP STACK INTO R5
 4709  024154  012604                      3.8           MOV     (6)+,R4         ;POP STACK INTO R4
 4710  024156  012603                      3.8           MOV     (6)+,R3         ;POP STACK INTO R3
 4711  024160  012602                      3.8           MOV     (6)+,R2         ;POP STACK INTO R2
 4712  024162  012601                      3.8           MOV     (6)+,R1         ;POP STACK INTO R1
 4713  024164  012600                      3.8           MOV     (6)+,R0         ;POP STACK INTO R0
 4714  024166  012737  024074  000024      5.2           MOV     #PDOWN$,@#24    ;SET UP THE POWER DOWN VECTOR
 4715  024174  012737  000340  000026      5.2           MOV     #340,@#26       ;PRIO:7
 4716  024202  000004  024206                            TYPE    .+2             ;.ASCIZ <15><12>"POWER"
 4717  024216  000167  155630              4.9           JMP     @VICE           ;JMP TO USER ADDRESS
 4718
 4719  024222  000000                      1.8  ILLUP:   HALT                    ;THE POWER UP SEQUENCE WAS STARTED
 4720  024224  000776                      2.5           BR      .-2             ; BEFORE THE POWER DOWN WAS COMPLETE
 4721
 4722  024226  000000                           .SAVR6:  0                       ;PUT THE SP HERE
 4723  024230  000024  000026               PUVEC$:  24,26                      ;POWER UP VECTOR
```

```
                                        ;OUTPUT DATA FILE FOR DISK AND DECTAPE
024234  000001  BUFF:    1                       ;COMMON OUTPUT FILE
        025234  .=BUFF+1000
025234  000001  INBFRF:  1                       ;RF11 INPUT BUFFER
        026234  .=INBFRF+1000
026234  000001  INBFTC:  1                       ;TC11 INPUT BUFFER
        027234  .=INBFTC+1000
027234          BINCNT:                         ;BEGINNING OF BINARY COUNT TABLE
027234      000 .BYTE   0
027235      001 .BYTE   1
027236      002 .BYTE   2
027237      003 .BYTE   3
027240      004 .BYTE   4
027241      005 .BYTE   5
027242      006 .BYTE   6
027243      007 .BYTE   7
027244      010 .BYTE   10
027245      011 .BYTE   11
027246      012 .BYTE   12
027247      013 .BYTE   13
027250      014 .BYTE   14
027251      015 .BYTE   15
027252      016 .BYTE   16
027253      017 .BYTE   17
027254      020 .BYTE   20
027255      021 .BYTE   21
027256      022 .BYTE   22
027257      023 .BYTE   23
027260      024 .BYTE   24
027261      025 .BYTE   25
027262      026 .BYTE   26
027263      027 .BYTE   27
027264      030 .BYTE   30
027265      031 .BYTE   31
027266      032 .BYTE   32
027267      033 .BYTE   33
027270      034 .BYTE   34
027271      035 .BYTE   35
027272      036 .BYTE   36
027273      037 .BYTE   37
027274      040 .BYTE   40
027275      041 .BYTE   41
027276      042 .BYTE   42
027277      043 .BYTE   43
027300      044 .BYTE   44
027301      045 .BYTE   45
027302      046 .BYTE   46
027303      047 .BYTE   47
027304      050 .BYTE   50
027305      051 .BYTE   51
027306      052 .BYTE   52
027307      053 .BYTE   53
027310      054 .BYTE   54
027311      055 .BYTE   55
027312      056 .BYTE   56
```

```
4780  027313  057                     .BYTE   57
4781  027314  060                     .BYTE   60
4782  027315  061                     .BYTE   61
4783  027316  062                     .BYTE   62
4784  027317  063                     .BYTE   63
4785  027320  064                     .BYTE   64
4786  027321  065                     .BYTE   65
4787  027322  066                     .BYTE   66
4788  027323  067                     .BYTE   67
4789  027324  070                     .BYTE   70
4790  027325  071                     .BYTE   71
4791  027326  072                     .BYTE   72
4792  027327  073                     .BYTE   73
4793  027330  074                     .BYTE   74
4794  027331  075                     .BYTE   75
4795  027332  076                     .BYTE   76
4796  027333  077                     .BYTE   77
4797  027334  100                     .BYTE   100
4798  027335  101                     .BYTE   101
4799  027336  102                     .BYTE   102
4800  027337  103                     .BYTE   103
4801  027340  104                     .BYTE   104
4802  027341  105                     .BYTE   105
4803  027342  106                     .BYTE   106
4804  027343  107                     .BYTE   107
4805  027344  110                     .BYTE   110
4806  027345  111                     .BYTE   111
4807  027346  112                     .BYTE   112
4808  027347  113                     .BYTE   113
4809  027350  114                     .BYTE   114
4810  027351  115                     .BYTE   115
4811  027352  116                     .BYTE   116
4812  027353  117                     .BYTE   117
4813  027354  120                     .BYTE   120
4814  027355  121                     .BYTE   121
4815  027356  122                     .BYTE   122
4816  027357  123                     .BYTE   123
4817  027360  124                     .BYTE   124
4818  027361  125                     .BYTE   125
4819  027362  126                     .BYTE   126
4820  027363  127                     .BYTE   127
4821  027364  130                     .BYTE   130
4822  027365  131                     .BYTE   131
4823  027366  132                     .BYTE   132
4824  027367  133                     .BYTE   133
4825  027370  134                     .BYTE   134
4826  027371  135                     .BYTE   135
4827  027372  136                     .BYTE   136
4828  027373  137                     .BYTE   137
4829  027374  140                     .BYTE   140
4830  027375  141                     .BYTE   141
4831  027376  142                     .BYTE   142
4832  027377  143                     .BYTE   143
4833  027400  144                     .BYTE   144
4834  027401  145                     .BYTE   145
4835  027402  146                     .BYTE   146
```

```
                                147                     .BYTE   147
                                150                     .BYTE   150
                                151                     .BYTE   151
                                152                     .BYTE   152
                                153                     .BYTE   153
4841    027410                  154                     .BYTE   154
4842    027411                  155                     .BYTE   155
4843    027412                  156                     .BYTE   156
4844    027413                  157                     .BYTE   157
4845    027414                  160                     .BYTE   160
4846    027415                  161                     .BYTE   161
4847    027416                  162                     .BYTE   162
4848    027417                  163                     .BYTE   163
4849    027420                  164                     .BYTE   164
4850    027421                  165                     .BYTE   165
4851    027422                  166                     .BYTE   166
4852    027423                  167                     .BYTE   167
4853    027424                  170                     .BYTE   170
4854    027425                  171                     .BYTE   171
4855    027426                  172                     .BYTE   172
4856    027427                  173                     .BYTE   173
4857    027430                  174                     .BYTE   174
4858    027431                  175                     .BYTE   175
4859    027432                  176                     .BYTE   176
4860    027433                  177                     .BYTE   177
4861    027434                  200                     .BYTE   200
4862    027435                  201                     .BYTE   201
4863    027436                  202                     .BYTE   202
4864    027437                  203                     .BYTE   203
4865    027440                  204                     .BYTE   204
4866    027441                  205                     .BYTE   205
4867    027442                  206                     .BYTE   206
4868    027443                  207                     .BYTE   207
4869    027444                  210                     .BYTE   210
4870    027445                  211                     .BYTE   211
4871    027446                  212                     .BYTE   212
4872    027447                  213                     .BYTE   213
4873    027450                  214                     .BYTE   214
4874    027451                  215                     .BYTE   215
4875    027452                  216                     .BYTE   216
4876    027453                  217                     .BYTE   217
4877    027454                  220                     .BYTE   220
4878    027455                  221                     .BYTE   221
4879    027456                  222                     .BYTE   222
4880    027457                  223                     .BYTE   223
4881    027460                  224                     .BYTE   224
4882    027461                  225                     .BYTE   225
4883    027462                  226                     .BYTE   226
4884    027463                  227                     .BYTE   227
4885    027464                  230                     .BYTE   230
4886    027465                  231                     .BYTE   231
4887    027466                  232                     .BYTE   232
4888    027467                  233                     .BYTE   233
4889    027470                  234                     .BYTE   234
4890    027471                  235                     .BYTE   235
4891    027472                  236                     .BYTE   236
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4892  027473  237                     .BYTE   237
4893  027474  240                     .BYTE   240
4894  027475  241                     .BYTE   241
4895  027476  242                     .BYTE   242
4896  027477  243                     .BYTE   243
4897  027500  244                     .BYTE   244
4898  027501  245                     .BYTE   245
4899  027502  246                     .BYTE   246
4900  027503  247                     .BYTE   247
4901  027504  250                     .BYTE   250
4902  027505  251                     .BYTE   251
4903  027506  252                     .BYTE   252
4904  027507  253                     .BYTE   253
4905  027510  254                     .BYTE   254
4906  027511  255                     .BYTE   255
4907  027512  256                     .BYTE   256
4908  027513  257                     .BYTE   257
4909  027514  260                     .BYTE   260
4910  027515  261                     .BYTE   261
4911  027516  262                     .BYTE   262
4912  027517  263                     .BYTE   263
4913  027520  264                     .BYTE   264
4914  027521  265                     .BYTE   265
4915  027522  266                     .BYTE   266
4916  027523  267                     .BYTE   267
4917  027524  270                     .BYTE   270
4918  027525  271                     .BYTE   271
4919  027526  272                     .BYTE   272
4920  027527  273                     .BYTE   273
4921  027530  274                     .BYTE   274
4922  027531  275                     .BYTE   275
4923  027532  276                     .BYTE   276
4924  027533  277                     .BYTE   277
4925  027534  300                     .BYTE   300
4926  027535  301                     .BYTE   301
4927  027536  302                     .BYTE   302
4928  027537  303                     .BYTE   303
4929  027540  304                     .BYTE   304
4930  027541  305                     .BYTE   305
4931  027542  306                     .BYTE   306
4932  027543  307                     .BYTE   307
4933  027544  310                     .BYTE   310
4934  027545  311                     .BYTE   311
4935  027546  312                     .BYTE   312
4936  027547  313                     .BYTE   313
4937  027550  314                     .BYTE   314
4938  027551  315                     .BYTE   315
4939  027552  316                     .BYTE   316
4940  027553  317                     .BYTE   317
4941  027554  320                     .BYTE   320
4942  027555  321                     .BYTE   321
4943  027556  322                     .BYTE   322
4944  027557  323                     .BYTE   323
4945  027560  324                     .BYTE   324
4946  027561  325                     .BYTE   325
4947  027562  326                     .BYTE   326
```

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 4948  027563      327                        .BYTE   327
 4949  027564      330                        .BYTE   330
 4950  027565      331                        .BYTE   331
 4951  027566      332                        .BYTE   332
 4952  027567      333                        .BYTE   333
 4953  027570      334                        .BYTE   334
 4954  027571      335                        .BYTE   335
 4955  027572      336                        .BYTE   336
 4956  027573      337                        .BYTE   337
 4957  027574      340                        .BYTE   340
 4958  027575      341                        .BYTE   341
 4959  027576      342                        .BYTE   342
 4960  027577      343                        .BYTE   343
 4961  027600      344                        .BYTE   344
 4962  027601      345                        .BYTE   345
 4963  027602      346                        .BYTE   346
 4964  027603      347                        .BYTE   347
 4965  027604      350                        .BYTE   350
 4966  027605      351                        .BYTE   351
 4967  027606      352                        .BYTE   352
 4968  027607      353                        .BYTE   353
 4969  027610      354                        .BYTE   354
 4970  027611      355                        .BYTE   355
 4971  027612      356                        .BYTE   356
 4972  027613      357                        .BYTE   357
 4973  027614      360                        .BYTE   360
 4974  027615      361                        .BYTE   361
 4975  027616      362                        .BYTE   362
 4976  027617      363                        .BYTE   363
 4977  027620      364                        .BYTE   364
 4978  027621      365                        .BYTE   365
 4979  027622      366                        .BYTE   366
 4980  027623      367                        .BYTE   367
 4981  027624      370                        .BYTE   370
 4982  027625      371                        .BYTE   371
 4983  027626      372                        .BYTE   372
 4984  027627      373                        .BYTE   373
 4985  027630      374                        .BYTE   374
 4986  027631      375                        .BYTE   375
 4987  027632      376                        .BYTE   376
 4988  027633      377                        .BYTE   377
 4989                                         .EVEN
 4990
 4991  027634  005015      000                RETURN: .ASCIZ  <15><12>
 4992  027637      015  020012  020040        SPACE:  .ASCIZ  <15><12>"   "
 4993  027644      000
 4994  027645      015  042012  053105        MSG0:   .ASCIZ  <15><12>"DEVICE    MAP"
 4995  027652  041511  020105  020040
 4996  027660  046440  050101      000
 4997  027665      015  042012  050532        MSGX:   .ASCIZ  <15><12>"DZQCA-G TESTED WITH "
 4998  027672  040503  043455  052040
 4999  027700  051505  042524  020104
 5000  027706  044527  044124  000040
 5001  027714  005015  054523  052123        MSG1:   .ASCIZ  <15><12>"SYSTEM CONFIGURATION"
 5002  027722  046505  041440  047117
 5003  027730  044506  052507  040522
```

```
 5004  027736  044524  047117     000
 5005  027743     040  040520  051523          MSGPAS: .ASCIZ  " PASS(ES),  "
 5006  027750  042450  024523  020054
 5007  027756  000040
 5008  027760  042440  051122  051117          MSGERR: .ASCIZ  " ERROR(S)."<15><12>
 5009  027766  051450  027051  005015
 5010  027774     000
 5011  027775     377  005015  020377          MSGHED: .ASCIZ  <377><15><12><377>"  PC     PS   SP"
 5012  030002  050040  020103  020040
 5013  030010  020040  051520  020040
 5014  030016  051440  000120
 5015                                          ;    UNIT   DEVADR    IS   SHOULD BE"
 5016  030022  005015  042504  044526          MSGDNR: .ASCIZ  <15><12>"DEVICE NOT RUNNING:"<15 <12>
 5017  030030  042503  047040  052117
 5018  030036  051040  047125  044516
 5019  030044  043516  006472  000012
 5020  030052  047101  044503  046114          MSGMAP: .ASCIZ  "ANCILLARIES:   "
 5021  030060  051101  042511  035123
 5022  030066  020040  000040
 5023  030072  041504  030461  024040                  .ASCIZ  "DC11 (0-15):   "
 5024  030100  026460  032461  035051
 5025  030106  020040  000040
 5026  030112  041504  030461  024040                  .ASCIZ  "DC11 (16-31):  "
 5027  030120  033061  031455  024461
 5028  030126  020072  000040
 5029  030132  046113  030461  020054                  .ASCIZ  "KL11, DL11A,B: "
 5030  030140  046104  030461  026101
 5031  030146  035102  000040
 5032  030152  050104  030461  024040                  .ASCIZ  "DP11 (0-15):   "
 5033  030160  026460  032461  035051
 5034  030166  020040  000040
 5035  030172  050104  030461  024040                  .ASCIZ  "DP11 (16-31):  "
 5036  030200  033061  031455  024461
 5037  030206  020072  000040
 5038  030212  046504  030461  035101                  .ASCIZ  "DM11A:         "
 5039  030220  020040  020040  020040
 5040  030226  020040  000040
 5041  030232  047104  030461  020072                  .ASCIZ  "DN11:          "
 5042  030240  020040  020040  020040
 5043  030246  020040  000040
 5044  030252  046504  030461  041102                  .ASCIZ  "DM11BB:        "
 5045  030260  020072  020040  020040
 5046  030266  020040  000040
 5047  030272  043513  030461  020072                  .ASCIZ  "KG11:          "
 5048  030300  020040  020040  020040
 5049  030306  020040  000040
 5050  030312  054104  030461  020072                  .ASCIZ  "DX11:          "
 5051  030320  020040  020040  020040
 5052  030326  020040  000040
 5053  030332  046104  030461  042103                  .ASCIZ  "DL11CDE (0-15):"
 5054  030340  020105  030050  030455
 5055  030346  024465  000072
 5056  030352  046104  030461  042103                  .ASCIZ  "DL11CDE(16-31):"
 5057  030360  024105  033061  031455
 5058  030366  024461  000072
 5059  030372  045104  030461  024040                  .ASCIZ  "DJ11 (0-7):    "
```

```
5060  030400  026460  024467  020072
5061  030406  020040  000040
5062
5063  030412  177777  177777     000          PADDERS:.ASCIZ  <377><377><377><377>
5064
5065
5066          030420                                  .EVEN
5067
5068  030420  000000                          DJ.XTBL:        0               ;DJ11 XMIT TABLE BUFFERS
5069          031016                          .=DJ.XTBL+376
5070  031016  000000  000000                          0,0
5071
5072  031022  000000                          DJ.EXP:         0               ;DJ11 RECV TABLE BUFFERS
5073          031420                          .=DJ.EXP+376
5074  031420  000000  000000                          0,0
5075
5076                                                  .EVEN
```

```
5077
5078  031424  000000                    LINKER: 0                       ;BEGINNING OF LINKER AREA
5079                                    ;LINKER AREA LOOKS LIKE THIS
5080                                    ;VEC300:
5081                                    ;       JSR     %5,@#RCV.ISR FOR COMM DEVICE 0
5082                                    ;       DEV.#                           =0
5083                                    ;VEC304: JSR    %5,@#XMT.ISR
5084                                    ;       DEV.#                           =0
5085                                    ;       "
5086                                    ;       "
5087                                    ;       SAME DEVICE (IF MORE THAN ONE) NEXT LINE NUMBER
5088                                    ;       "
5089                                    ;       "
5090                                    ;       .
5091                                    ;       .
5092                                    ;VECXXX: JSR    %5,@#RCV.ISR FOR NEXT DEVICE TYPE
5093                                    ;       DEV.#                           =0
5094                                    ;       "
5095                                    ;       "                               =0
5096                                    ;
5097                                    ;THE VECTOR FOR THE FIRST COMM DEVICE SHOULD BE 300
5098                                    ;THE CONTENTS OF 300 SHOULD BE # LINKER AND
5099                                    ;LINKER SHOULD POINT TO THE INTERRUPT SERVICE ROUTINE
5100                                    ;FOR THAT DEVICE AND SHOULD INTICATE LINE ZERO
5101                                    ;NOTE: SPECIAL PATCHES FOR PRODUCTION CHECKOUT WILL MAKE
5102                                    ;EXCEPTIONS TO THIS RULE-OK
5103                                    ;FOLLOWING THE LINKER AREA IS THE DM CORE.
5104                                    ;
5105                                    ;CAT0:  =CURRENT ADDRESS TABLE FOR CHANNEL 0
5106                                    ;
5107                                    ;"+40:  =WORD COUNT
5108                                    ;"+100: =BIT ASSEMBLY TABLE
5109                                    ;"+140: =UNUSED
5110                                    ;"+200: =TUMBLE TABLE
5111                                    ;
5112                                    ;CAT1:  =CURRENT ADDRESS TABLE FOR CHANNEL 1
5113                                    ;
5114                                    ;ETC.
5115                                    ;
5116                                    ;
5117
5118          000001                            .END
```

```
.  = 000400
```

```
564#  565#  566#  567#  568#  569#  570#  571#  572#  573#  574#  575#  576#
577#  578#  579#  580#  581#  582#  583#  584#  585#  586#  587#  588#  589#
590#  591#  592#  593#  594#  595#  596#  2568#  2569#  2570#  2571#  2572#  2573#
2574#  2575#  2576#  2577#  2578#  2579#  2580#  2581#  2582#  2583#  2584#  2585#  2586#
2587#  2588#  2589#  2590#  2591#  2592#  2593#  2594#  2595#  2596#  2597#  2598#  2599#
2600#  2664#  2665#  2666#  2667#  2668#  2669#  2670#  2671#  2672#  2673#  2674#  2675#
2676#  2677#  2678#  2679#  2680#  2681#  2682#  2683#  2684#  2685#  2686#  2687#  2688#
2689#  2690#  2691#  2692#  2693#  2694#  2695#  2696#  2762#  2763#  2764#  2765#  2766#
2767#  2768#  2769#  2770#  2771#  2772#  2773#  2774#  2775#  2776#  2777#  2778#  2779#
2780#  2781#  2782#  2783#  2784#  2785#  2786#  2787#  2788#  2789#  2790#  2791#  2792#
2793#  2794#  2796#  2797#  2798#  2799#  2800#  2801#  2802#  2803#  2804#  2805#  2806#
2807#  2808#  2809#  2810#  2811#  2812#  2813#  2814#  2815#  2816#  2817#  2818#  2819#
2820#  2821#  2822#  2823#  2824#  2825#  2826#  2827#  2828#  2914#  2915#  2916#  2917#
2918#  2919#  2920#  2921#  2922#  2923#  2924#  2925#  2926#  2927#  2928#  2929#  2930#
2932#  2933#  2934#  2935#  2936#  2937#  2938#  2939#  2940#  2941#  2942#  2943#  2944#
2945#  2946#  2947#  2948#  2950#  2951#  2952#  2953#  2954#  2955#  2956#  2957#  2958#
2959#  2960#  2961#  2962#  2963#  2964#  2965#  2966#  2968#  2969#  2970#  2971#  2972#
2973#  2974#  2975#  2976#  2977#  2978#  2979#  2980#  2981#  2982#  2983#  2984#  2986#
2987#  2988#  2989#  2990#  2991#  2992#  2993#  2994#  2995#  2996#  2997#  2998#  2999#
3000#  3001#  3002#  3078#  3079#  3080#  3081#  3082#  3083#  3084#  3085#  3086#  3087#
3088#  3089#  3090#  3091#  3092#  3093#  3094#  3095#  3096#  3097#  3098#  3099#  3100#
3101#  3102#  3103#  3104#  3105#  3106#  3107#  3108#  3109#  3110#  3111#  3112#  3113#
3114#  3115#  3116#  3117#  3118#  3119#  3120#  3121#  3122#  3123#  3124#  3125#  3126#
3127#  3128#  3129#  3130#  3131#  3132#  3133#  3134#  3135#  3136#  3137#  3138#  3139#
3140#  3141#  3142#  3816#  3817#  3818#  3819#  3820#  3821#  3822#  3823#  3824#  3825#
3826#  3827#  3828#  3829#  3830#  3831#  3832#  3833#  3834#  3835#  3836#  3837#  3838#
3839#  3840#  3841#  3842#  3843#  3844#  3845#  3846#  3847#  3848#  4733#  4734#  4735#
4736#  4737#  4738#  4739#  4740#  4741#  4742#  4743#  4744#  4745#  4746#  4747#  4748#
4749#  4750#  4751#  4752#  4753#  4754#  4755#  4756#  4757#  4758#  4759#  4760#  4761#
4762#  4763#  4764#  4765#  4766#  4767#  4768#  4769#  4770#  4771#  4772#  4773#  4774#
4775#  4776#  4777#  4778#  4779#  4780#  4781#  4782#  4783#  4784#  4785#  4786#  4787#
4788#  4789#  4790#  4791#  4792#  4793#  4794#  4795#  4796#  4797#  4798#  4799#  4800#
4801#  4802#  4803#  4804#  4805#  4806#  4807#  4808#  4809#  4810#  4811#  4812#  4813#
4814#  4815#  4816#  4817#  4818#  4819#  4820#  4821#  4822#  4823#  4824#  4825#  4826#
4827#  4828#  4829#  4830#  4831#  4832#  4833#  4834#  4835#  4836#  4837#  4838#  4839#
4840#  4841#  4842#  4843#  4844#  4845#  4846#  4847#  4848#  4849#  4850#  4851#  4852#
4853#  4854#  4855#  4856#  4857#  4858#  4859#  4860#  4861#  4862#  4863#  4864#  4865#
4866#  4867#  4868#  4869#  4870#  4871#  4872#  4873#  4874#  4875#  4876#  4877#  4878#
4879#  4880#  4881#  4882#  4883#  4884#  4885#  4886#  4887#  4888#  4889#  4890#  4891#
4892#  4893#  4894#  4895#  4896#  4897#  4898#  4899#  4900#  4901#  4902#  4903#  4904#
4905#  4906#  4907#  4908#  4909#  4910#  4911#  4912#  4913#  4914#  4915#  4916#  4917#
4918#  4919#  4920#  4921#  4922#  4923#  4924#  4925#  4926#  4927#  4928#  4929#  4930#
4931#  4932#  4933#  4934#  4935#  4936#  4937#  4938#  4939#  4940#  4941#  4942#  4943#
4944#  4945#  4946#  4947#  4948#  4949#  4950#  4951#  4952#  4953#  4954#  4955#  4956#
4957#  4958#  4959#  4960#  4961#  4962#  4963#  4964#  4965#  4966#  4967#  4968#  4969#
4970#  4971#  4972#  4973#  4974#  4975#  4976#  4977#  4978#  4979#  4980#  4981#  4982#
4983#  4984#  4985#  4986#  4987#  4988#  4989#
```

```
ACTIVE= 004000  2728  3023#
ACTVOC  022724  4440#
AOS     021706  4242#
AO.DC   001600  650#  768  1392
AO.DJ   001632  663#  1861  3876  3942
AO.DLC  001630  662#  1800  3750
AO.DLX  001700  689#  3717
AO.DMA  001606  653#
AO.DMB  001612  655#  2153  3166
```

```
AD.DN   001610            654*   2122
AD.DP   001604            652*
AD.DR   001616            657*
AD.DT   001624            660*
AD.DX   001626            661*
AD.KG   001614            656*   2194
AD.KL   001602            651*
AD.KLX  001676            688*
AD.PAP  001622            659*
AD.PAR  001620            658*
ANCIL   002420            833*
ANCMAP  023042           4487*
ANCNIT  007650           1852    1903    1924*
ANC1    002466            834     845*
ANC2    002506            845     848*
ANC3    002526            848     851*
ANC4    002546            851     854*
ANC5    002566            854     857*
ANC6    002606            857     860*
ANEXT   003034            833     924*
ANYDC   002174            775*
ANYDJ   002406            826*
ANYDLC  002372            822*
ANYDMA  002236            787*
ANYDMB  002256            794*
ANYDN   002250            791*
ANYDP   002214            782*
ANYDR   002272            800*
ANYDT   002340            813*
ANYDX   002352            817*
ANYKG   002264            797*
ANYKL   002202            778*
ANYPAP  002332            810*
ANYPAR  002320            806*
BCKCOR  011652           2191    2224    2306*
BCKGND  010752            723    2103*   2458
BEGIN   001702            456     460     691*    749
BEGINX  001734            694     696*
BELL  = 000207            356*   2436    4546
BELL1   012400           2422    2433*
BELL2   012424           2434    2438*
BELL3   012456           2441    2443    2446*
BINCNT  027234           1471*   1509    1551*   1566    2852    4732*
BITYP$  023556           2399    2402    4511    4623*
BIT0  = 000001            297*    836     877     955    1059    1520    1525    1951    2478    2485
BIT1  = 000002            298*    847     961    1068    1964
BIT10 = 002000            307*   2433
BIT11 = 004000            308*   1051
BIT12 = 010000            309*
BIT13 = 020000            310*    878    2391    2421
BIT14 = 040000            311*
BIT15 = 100000            312*    782     785     801     804    1441    1885    2859
BIT2  = 000004            299*    850     973    1077    1647    1975    3041    3074
BIT3  = 000010            300*    853     979    1086    1995
BIT4  = 000020            301*    856     991    1096    2004
BIT5  = 000040            302*    859     997    1106    2018
```

```
BIT6  = 000100   303#  1003  1116  1959  2002  2480  2482  2487  2488
BIT7  = 000200   304#  1009  1126  2707  2907  3048  3722  3755  4016  4033
BIT8  = 000400   305#  1015  2314
BIT9  = 001000   306#  1036  2306
BMOV    006264  1488   1544  1613#
BR.CTY  001656   678#  1954  1956
BR.DC   001634   669#  1170
BR.DJ   001654   677#
BR.DLC  001652   676#
BR.DMA  001642   672#
BR.DMB  001646   674#
BR.DN   001644   673#
BR.DP   001640   671#
BR.DX   001650   675#
BR.KL   001636   670#
BR.LP   001660   679#  1967
BR.RF   001664   681#  1998
BR.RK   001666   682#  2010
BR.RP   001670   683#  2021
BR.TC   001662   680#  1978
BSYEN = 004000   394#  1775
BUFA  = 000012   366#  3374  3388  3438*  3548*  3549*  3560*  3561*
BUFC  = 000014   367#  3376  3378  3390  3392  3436*  3550*  3562*
BUFF    024234  1925   2104  2113  4179  4279  4300  4378  4726#  4727
BUSY  = 000020  2148#  2158
CARGEN  020740  1970*  4070#  4080*  4081  4083*  4093
CE    = 000010   411#  3176#  3465  3530  3653  3672
CHAIN = 000003   437#  3454
CHDEND= 000040   408#  3304  3432
CHENDS= 001000   403#  3528
CHIS  = 000200   405#  3300
CHRLIN  020736  1968*  4069#  4084*  4090*
CLEAN   016136  3290   3333#
CLEANU  020214  2535   2563  2624  2656  2730  2752  2758  2860  2908  3075  3171  3215  3739
                3808   3849#
CLEAR   023046   765    935  1472  1854  2333  2362  4493#
CLENDJ  020512  3920   3999#
CLENUP  020220  3425   3851#
CLINK   001024   476#   717*  2412*  2440  2446*
CLRDXD  015534  1790   3218#
CLRMUX= 002000  2142#  2157
CLRSCN= 004000  2141#  2157
CLRVEC  002066   718    741#
CLR1    023056  4497#  4499
CL1     006606  1681#  1683
CMA     021674  4237#  4279*  4300*  4321*
CMDCHN= 000004   398#  3452
CMDREJ= 000200   418#  3523
CMD.ST  017572  1707   3649#
CNT     022716  1516*  1518*  4437#
CODRCV  005036  1291   1311   1338#
CODXMT  005062  1292   1345#
COREX   011666  2310#  2311   2313
CORNIT  010570  2041   2047#
COUNT1  012724  2505#
COUNT2  012726  2506#
```

```
CTKB    023014          4036    4038    4040    4042    4475#
CTKDAT  020722          1957#   4038    4045#   4046    4048#   4052#
CTKRCV  020724          4040#   4041#   4054#
CTKS    023012           835    1960#   2482#   2488#   4033    4049#   4474#
CTPB    023020          4023#   4477#
CTPDAT  020612          1958#   4019#   4020    4022#   4023    4028#
CTPS    023016           839     841#    842#   1959#   2480#   2487#   4016    4476#
CTPI    020566          4021    4023#
CTYDWN  012602          2393    2423    2435    2478#   2494    4545
CTYNIT  010026          1941    1951#
CTYP    020534          1955    4016#
CTYR    020614          1953    4033#
CTYR2   020714          4043    4047    4049#
CTYR3   020672          4039    4045#
CTYR4   020676          4037    4046#
CTYUP   012634          2415    2432    2437    2485#   2499    4547
CU      016230          1757    3273    3356#   3373    3387    3403    3414
CUART = 000002           383#   3273*   3274
CUBSY = 000400           396#   3270    3499
CUCRT = 000003           384#   3540    3542    3563
CUDEMO= 000020           407#   3304    3434
CUDT  = 000002          3364#   3371    3385
CUE   = 000040           415#   3504
CUES  = 000001          3363#   3401    3412    3475
CUIDL = 000000          3362#
CV1     002076           743#    747
CX1$    006752          1725    1731#
DACNT   022714          4436#
DAE     021700          4239#   4282*   4303*   4324*
DAF     021676          4238#   4281*   4302*   4323*
DATA  = 000001           433#   3369    3383    3397    3480    3547    3559
DATINT  007662          1926#   1943
DBR     021702          4240#
DCADRS  023002          4470#
DCDATA  013104          1393    2532*   2534    2554    2557    2559*   2561*   2567#
DCINIT  005206          1388#
DCOUT   012764          2533#
DCRX1   013064          2558    2561#
DCRX2   013072          2560    2562#
DCS     021670          2002*   4235#   4275    4278*   4283*   4296    4299*   4304*   4317    4320*   4325*
DCT   = 000000           374#   1739*   1742    1744*   1749    1761*   1762*   3336*   3337    3368*   3369    3374    3376
                        3378    3382*   3383    3388    3390    3392    3396*   3397    3399    3404    3409*   3410    3415
DCTA    006460          1662#   1735*   1739
DCTP    017632          1740    1756    3276    3284    3336    3689#
DCTZ  = 000420           370#   1743
DC.RCV  012776          1177    2539#
DC.XMT  012730          1178    2521#
DE    = 000004           412#   3177#   3465    3530    3653    3672
DEV     016210          1731*   3282    3333*   3334    3341*   3342*   3343    3346#   3372    3386    3402    3413
DEVCNT  023044           896*    904*    919    4488#
DEVICE  005114           722    1366#   2457
DEVNUM= 000010          1718    3186#   3187
DEVSTA= 000004           363#   3369    3383    3397    3399    3410    3451*   3454*   3468*   3480    3483    3496    3547*
                        3559#
DFILE   022710          1925*   1929*   1930*   1932*   1933*   4434#
DF.T.C  017532          3629#
```

DZQCAG.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
DFLT.S  017612          3668#
DISPLA= 177570           348#  4680*  4684*
DI1     007704          1929#  1938   1947
DJINIT  007440          1797   1838   1851#
DJLINE  007642          1872#  1883   1887*  1908#
DJ.BNT  007646          1877#  1880   1890*  1910#
DJ.CNT  007644          1858#  1899*  1909#
DJ.EXP  031022          1862   3973   3976   3990*  3991*  5072#  5073
DJ.RCV  020344          1263   3927#
DJ.RTL  020530          1866#  3992*  4010#
DJ.TEM  020532          3940#  3941*  3971   4011#
DJ.XMT  020224          1264   3858#
DJ.XTB  030420          1855   3905   3906*  3907*  5068#  5069
DJ.XTL  020526          1865#  3916#  4009#
DLDATA  020114          1801   3735*  3736*  3738   3786   3788   3802   3804*  3806*  3815#
DLINIT  007230          1666   1781   1796#
DLOUT   017730          3737#
DLRX1   020072          3803   3806#
DLRX2   020100          3805   3807#
DLSAVE  020112          3785*  3786   3789   3810#
DLYCNT  007434          1807*  1810*  1816*  1819*  1844#
DL.RCV  017742          1254   3743#
DL.XMT  017652          1255   3710#
DMADRS  023006          1486   1552   4472#
DMANIT  005572          1435   1467#
DMARK   014546          2849*  2850   2854   2857*  2911#
DMA.C   005676          1506#  1534
DMA.DD  005742          1517#  1519
DMA.1   006004          1507   1528#
DMA.10  006134          1558#  1585
DMA.11  006250          1489   1594#
DMA.12  006256          1545   1606#
DMA.13  006052          1538   1541#
DMA.2   006016          1526   1533#
DMA.3   006036          1537#  1543
DMA.4   006170          1560*  1567#
DMA.5   006202          1561*  1572#
DMA.6   006200          1563*  1571#
DMA.8   006222          1559   1580#
DMA.9   006234          1578   1584#
DMBBOT  011252          2156   2181#
DMBISR  015370          1208   3159#
DMBTOP  011124          2155#  2184
DMY.IS  015436          1227   3195#
DM.CAT  014652          1493   1553   2949#
DM.LDA  014612          1473   1535   1556   1594*  2853   2890*  2891   2894*  2896*  2931#
DM.RCV  014342          1197   2865#
DM.RDA  015012          1606   2886   2891   2893*  2897*  3003#
DM.R1   014372          2874   2876#
DM.R2   014376          2877#
DM.R3   014404          2878   2880#  2902   2904
DM.R4   014472          2884   2895   2898#
DM.R5   014524          2882   2905#
DM.R6   014422          1490   1546   2886#
DM.R7   014462          2892   2896#
DM.R8   014550          2899*  2900*  2901   2912#
```

```
DM.TT   014752          1495    1555    2876    2905*   2985#
DM.WCT  014712          1494    1554    2967#
DM.XMT  014222          1198    2833#
DM.X1   014254          2842    2844#
DM.X2   014262          2846    2848#
DM.X3   014274          2850#   2858
DM.X4   014320          2851    2856#
DM11BB  011100          2119    2149#
DNACT   011026          2118#
DNADRS  023010          3039    4473#
DNBK1   011056          2126#   2133
DNBK2   011072          2127    2131#
DNDATA  015242          1636    2121    3044    3063*   3077#
DNIFLG  015366          3040*   3065*   3070    3155#
DNINIT  006340          1469    1587    1634#
DNPR1   006364          1639#   1652
DNPR2   006426          1640    1649#
DNPR3   006434          1648    1651#
DNPR4   006400          1642#   1646
DNRCVD  015354          3053    3149#
DNXMTD  015342          1644    2130    3143#
DN.ISR  015054          1203    3031#
DN.I1   015114          3042#   3069
DN.I2   015206          3043    3066#
DONE  = 000200           390#   2147#   2177    3265
DPADRS  023004          4471#
DPIA    005476          1436#   1444#   1460    1461*
DPIB    005464          1442#   1463
DPIC    005530          1445    1454#
DPINIT  005420          1411    1434#
DPRCVD  014022          1438    2711#   2712    2714    2720*   2725*   2726*   2760#
DPXMTD  014122          1437    2721#   2748    2749*   2754*   2756*   2795#
DP.RCV  013532          1190    2698#
DP.R1   013660          2713    2726#
DP.R2   013654          2715    2725#
DP.R4   013672          2727    2729#
DP.R5   013666          2724    2728#
DP.XMT  013704          1191    2734#
DP.X2   013770          2747    2753#
DP.X3   014016          2750    2755    2758#
DST     006454          1660#   1676*   1682    1691    1704    1763    1770*   1777*
DS.0    006664          1704#
DS.1    006674          1706#   1709*
DS.2    006702          1708#   1710
DS.3    015544          3220#   3222
DS.4    006634          1692#   1694
DS.5    006654          1700#   1702
DS1     016036          3293    3296#
DS2     016054          3297    3300#
DS3     016072          3301    3304#
DS4     016110          3305    3309#
DTDONE  016634          3306    3431#
DTERR   016676          3435    3442#
DVICE   002052           715     722#    726     4583    4717
DXBG    017406          3225*   3374*   3388*   3576#
DXBC    017410          3226*   3375*   3378*   3389*   3392*   3577#
```

DZQCAC.F11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
DXBF   = 000020   369* 3560
DXCA     017400  3372* 3373* 3386* 3387* 3402* 3403* 3413* 3414* 3573*
DXCB     017416  3580*
DXCS     017402  1769* 1771* 1772* 1775* 1776* 1779* 1780* 1789* 1792* 3212* 3227* 3265* 3270*
                 3379* 3393* 3405* 3416* 3499  3574*
DXDAT    006456  1661* 1678* 3201  3218  3225
DXDCK    015456  3203* 3210
DXDS     017376  3501  3572*
DXDSC    017024  3294  3480*
DXDTE    015474  3204  3208*
DXES     017422  3211* 3233* 3582*
DXES1    017426  3584*
DXGO     015554  1793  3213  3225*
DXINIT   006462  1635  1653  1664*
DXISS    017132  3302  3513*
DXI.D    006474  1665  1668*
DXLEGA   017430  1025  3356  3588*
DXLP     016206  3345*
DXMI     017414  3579*
DXMO     017412  1791* 3228* 3229* 3230* 3231* 3578*
DXMOB    017424  3583*
DXMD     017420  3581*
DXOFLI   007176  1717  1789*
DXOLI    006712  1716*
DXOL.I   015636  1244  3251*
DXOS     017404  1684* 3404* 3415* 3575*
DXOUT    015530  3207  3215*
DX.ISR   015442  1226  3199*
DX.OLF   006444   938* 1021* 1022  1228  1242  1656* 1716  2355
EMASK    022740  4446*
ENDCOR   001504   617* 1384* 1724  2050  2312
ENDEN  = 020000   388* 1772  1776
ENDLNK   001500   615* 1274* 1368
ENDTAB   001502   616* 1369* 1483* 1484* 1485  1586* 1668* 1669* 1670  1671* 1672  1673* 1674
                 1675* 1676  1677* 1678  1679* 1735  1749* 2049* 2051  2318
ENDVEC   001476   614* 1272*
ERRDST   015434  3189*
ERRORS   001202   486*  697* 2390* 2428  4550  4574*
ESDONE   016700  3298  3446* 3536
ESEND  = 000100   402*  3396
ES1      016736  3453  3455*
EXPND3   011700  2307  2314*
FCTNR  = 000003   392*  3379
FCTNS  = 000007   393*  3405  3416
FCTNW  = 000005   391*  3393
FDATA    022706  1927* 1929  1931* 1932  1935* 1936* 1937  1945* 1946* 4433*
FENDZ    021142  1977  4125* 4214
FEND1    021166  4127  4131*
FIRSTV   001672   685* 1168
FL.ANC= 000001   491* 4024  4094  4229  4333  4355  4423
FL.CTY= 000001   503* 4025
FL.DC  = 000002   492*  776  1388  2339  2562
FL.DJ  = 004000   502*  828  1851  2361  3997
FL.DLC= 001000   500*  824  1796  2359  3807
FL.DMA= 000020   495*  789  2345  2906
FL.DMB= 000100   497*  795  2349  3170
```

DZQCAG.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
FL.DN = 000040          496*   792   2347   3035
FL.DP = 000010          494*   784   1434   2343   2729
FL.DX = 000400          499*   820   2354   3214   3251
FL.KG = 000200          498*   798   2219   2351
FL.KL = 000004          493*   780   2341   2655
FL.LP = 000002          504*  4095
FL.RF = 000010          506*  4334
FL.RK = 000020          507*  4356
FL.RP = 000040          508*  4424
FL.TC = 000004          505*  4230
FSEG    022704         1924*  1939*  1940   1942   4432*
FVECT   001026          479*  1273*
FVECTX  004560         1273*
GO    = 000001          386*
HERE  = 000000          350*
HLT   = 104000          353*  1813   1822   1832   2008   2062   2082   2084   2087   2090   2109   2112   2176
                       2211   2531   2549   2552   2556   2614   2617   2639   2642   2649   2709   2719   2745
                       2843   2847   2875   2879   2889   3051   3055   3072   3169   3195   3206   3734   3766
                       3783   3801   3900   3963   3988   4018   4035   4044   4076   4079   4139   4141   4145
                       4153   4155   4161   4190   4192   4196   4208   4211   4218   4269   4277   4298   4319
                       4360   4364   4368   4392   4407
HLTRD$  023446         4541*  4563*  4585*
HLT$    023210          451   4539*
HLT01   003114           10    952*
HLT02   003140           25    958*
HLT03   003164           37    964*
HLT04   003206           46    970*
HLT05   003232           55    976*
HLT06   003256           64    982*
HLT07   003300           73    988*
HLT10   003324           82    994*
HLT11   003350           91   1000*
HLT12   003374          100   1006*
HLT13   003420          109   1012*
HLT14   003444          118   1018*
HLT15   003550          132   1039*
HLT16   003572          141   1045*
HLT20   003644          158   1063*
HLT200  003620          150   1055*
HLT21   003670          169   1072*
HLT22   003714          180   1080*
HLT23   003740          191   1090*
HLT24   003764          202   1100*
HLT25   004010          213   1110*
HLT26   004034          221   1120*
HLT27   004060          231   1130*
HLT70   003512          129   1028*
HLT77   004176          241   1155*
HOOK    012524         2439   2456   2458*
ICNT    001200          485*   692   2115*  4673   4675   4677*  4678*  4680   4683*  4684   4690
IDLE  = 000000          431*
IE    = 000100          389*
ILLC  = 000405         3183*  3636
ILLUP   024222         4692   4719*
INBFRF  025234         2106   4321   4728*  4729
INBFTC  026234         2105   4224   4730*  4731
```

```
INFDSC= 004000   406*  3292  3432
INIT1   007022  1744*  1746
INIT2   007014  1742*  1748
INIT3   007062  1761*  1766
INIT4   007156  1774   1779*
INTENA= 000100  2145*  2168
INTOUT  016112  3271   3295  3299  3303  3307  3311*
INTREQ= 000100   419*  3526
INT1    015736  3269   3273*
INT2    016010  3279   3288*
IOTSAV  011744   702*  2047  2324  2331*
IOT$    023450   449    700   703  4595*
ISSHX   017304  3541   3553*
ISSH1   017176  3519   3524  3528*
ISSH1A  017170  3522   3526*
ISSH2   017212  3529   3534*
ISSH3   017224  3535   3540*
ISSH4   017306  3543   3558*
ISSH5   017360  3564   3567*
ISSH6   017366  3566   3568*
ISSREJ= 000010   397*  3501
KGCIT   011446  2228*
KGCP    011512  2200   2214  2252*
KGC12   011450  2217   2229*
KGDP    011452  2199   2216  2233*
KGEND   011422  2197   2206  2220*
KGIP    011444  2198   2227*
KGSTRT  011266  2150   2190*
KGTA    011336  2201*  2215  2218
KGTEMP  011442  2208*  2209  2226*
KGTEST  011322  2198*
KGTOP   011312  2196*  2223
KIT$    024042  4670   4676  4683*
KLADRS  022776  4468*
KLCSR   005354  1421*  1430
KLDAT   005324  1414*  1416
KLDATA  013432  1412   2619*  2620  2622*  2623  2645  2650*  2651  2653*  2660  2661  2663*
KLINIT  005304  1389   1402  1410*
KLOFF   005400  1422   1426*
KLRA  = 176502  2628*  2637  2640  2643  2645  2647  2654*
KLRB  = 013433  2661*
KLRSO   023000  1418   4469*
KLRI    013406  2653*
KLR2    013414  2644   2652  2654*
KLR3    013372  2646   2650*
KLR4    013376  2648   2651*
KLXA  = 176504  2603*  2612  2615  2623*
KLXB  = 013432  2660*
KLXSET  001674   686*  1424
KL.SO   022774  1419   4467*
KL.XT   013270  2621   2623*
KL.RCV  013302  1184   2630*
KL.XMT  013204  1185   2605*
LAD     024070  2116*  2328*  4679*  4685  4687  4690*
LEVEL4= 000200   330*
LEVEL5= 000240   331*
```

```
LEVEL6= 000300          332#
LEVEL7= 000340          333#
LIMIT   022702         1928#  1937   1944#  4431#
LINE    022770         1280#  1293#  1301#  1312#  1342   1349   4462#
LINEO = 017000         2863#
LINGTH  020734         1969#  4068#  4087#  4089#  4090
LINK    004572         1176   1183   1189   1196   1225   1253   1262   1280#
LINKER  031424          615   1169   5078#
LINKOI  010544         2037#  2038#
LINKOP  010564         2042#  2043#
LINK1   004676         1202   1207   1301#
LLIMIT  022514         2012   2023   4352   4378#  4420
LNK1    004620         1286#  1299
LNK11   004720         1306#  1318
LNK12   004726         1307#  1316
LNK13   004742         1308   1311#
LNK14   004746         1310   1312#
LNK15   004772         1285   1295   1305   1314   1319#
LNK2    004626         1287#  1297
LNK3    004642         1288   1291#
LNK4    004652         1290   1293#
LOAD    006312         1565   1570   1623#
LOOP    016142         3334#  3344
LOWADR  021712         2000#  4244#  4281   4284#  4288#  4302   4305#  4309#  4323   4326#  4331#
LPB     020730         4064#  4086#  4093#
LPINIT  010116         1952   1964#
LPS     020726         1971#  4060#  4074   4077
LPSIZE  020732         1968   1969   4067#  4089
LPVECT  020742         1966   4074#
LPO     020762         4080#
LP1     021004         4082   4084#
LP11    023026          846   4480#
LP2     021044         4085   4093#
LP3     021034         4088   4090#
LREQ  = 000002          362#  3285   3439   3449#  3460   3467#  3506#  3552#  3568#
MAINT = 001000         2143#  2168
MAP     001342          559#  2219#  2363   2463   2562#  2655#  2729#  2906#  3035#  3170#  3214#  3251#  3807#
                       3997#
MAPIT   002736          775    779    783    788    791    794    797    802    807    810    814    819    823
                        827    894#
MAPSIZ= 000017          489#   767    866    937    943   1136   2335   2367   4503
MAR     021704         4241#
MARK    022766          897#   906    909#  1230#  1232   1235#  1238#  1240   1242   1246#  1286#  1287   1296#
                       1306#  1307   1315#  1420#  1421   1429#  1443#  1444   1459#  1505#  1506   1533#  1536#
                       1537   1542#  1557#  1558   1584#  1638#  1639   1651#  2154#  2155   2183#  2195#  2196
                       2222#  4458#
MAX     022764          895#   907#  1231#  1236#  1239#  1247#  1284#  1294#  1304#  1313#  1323#  1324#  1413#
                       1415#  2462#  2469#  4457#
MAX.DE  015432         3187#
MEMDAT  010706         2079#  2080#  2085   2088
MEMEND  010752         2064   2092#
MEMTST  010700         2054   2077#
MIT1    002750          897#   912
MIT2    002756          898#   910
MIT4    003022          908    918#
MIT5    002770          782#   795#  801#  804#  806#  813#  818#  822#  905#
```

```
MODE    016224          1773    3354#   3473    3493
MODIO   005024          1224    1252    1260    1270    1322    1332#
MONIT   012134          2369#   2388    2418
MONITX  012176          2377    2381    2390#
MONITZ  012150          2380#   2383#   2385
MONITI  012276          2370    2392    2416#
MSGDMR  030022          2394    5016#
MSGERR  027760          2430    5008#
MSGHED  027775          4552    5011#
MSGMAP  030052          2368    4504    5020#
MSGPAS  027743          2427    5005#
MSGX    027665          2495    4997#
MSGO    027645          4994#
MSGI    027714           880    2496    5001#
MX.DC   001542           634#    771    2357
MX.DJ   001574           647#
MX.DLC  001572           646#
MX.DMA  001550           637#
MX.DMB  001554           639#
MX.DN   001552           638#
MX.DP   001546           636#
MX.DR   001560           641#
MX.DT   001566           644#
MX.DX   001570           645#   2352
MX.KG   001556           640#
MX.KL   001544           635#
MX.NEX  001576           648#
MX.PAP  001564           643#
MX.PAR  001562           642#
N     = 000010          3688#   3691#   3693#   3695#   3697#   3699#   3701#   3703#   3705#
NACT    010250          1984    1988#
NOCS    023030          4482#
NOMS    023036          4485#
NONS    023040          4486#
NOPS    023034          4484#
NEXT    003020           772     917#
NKLS    023032          4483#
NONL    007174          1727#   1738    1755    1784#
NOP   = 000240           351#
NOPC  = 000403          3181#   3634
NOSAC   002446           839#    840
NO.DC   001506           619#    770    1171    1390
NO.DJ   001540           632#   1858
NO.DLC  001536           631#   1798
NO.DMA  001514           622#
NO.DMB  001520           624#
NO.DN   001516           623#   2123
NO.DP   001512           621#
NO.DR   001524           626#
NO.DT   001532           629#
NO.DX   001534           630#   1034    1231    1239
NO.KG   001522           625#
NO.KL   001510           620#
NO.PAP  001530           628#
NO.PAR  001526           627#
NTI     003036           925#
```

```
NT2     003040           834*   845*   848*   851*   854*   857*   926#
NUMDEV  006750          1718*  1729#  3342
ONE     022712          1926*  1936   4435#
ONLF  = 000006           364#  1762*  3521
ONLINA= 001000           387#  1779
OPEN  = 000000           352#  1567   1571   1572
OVERL   011716          2070   2315   2324#
OVERLY  010530          2019   2035#
OVERS   024046          4684#
OVINIT  001060           465#  2035   2037   2038
OVPRIM  001022           468#  2040   2042   2043
PACDER  030412          2491   5063#
PASEND  012334          2424#
PASSES  001204           487#   698*  2376   2420*  2425
PC    =%000007           344#   718*   719*   720*   721*   722*   723*   750*   873*   883*   884*   925    949*
                        1158*  1224*  1252*  1260*  1270*  1275*  1322*  1334*  1613*  1620*  1623*  1630*  1705*
                        1726*  1790*  1793*  2038*  2043*  2073*  2078*  2379   2393*  2399*  2402*  2415*  2423*
                        2426*  2429*  2432*  2435*  2437*  2444*  2457*  2481*  2483*  2489*  2492*  2494*  2498*
                        2499*  2500*  3223*  3252*  3254*  3256*  3258*  3260*  3262*  3294*  3298*  3302*  3306*
                        3339*  3366*  3380*  3394*  3406*  3417*  3440*  3455*  3456*  3461*  3469*  3476*  3486*
                        3487*  3508*  3553*  3569*  4494*  4500*  4511*  4516*  4545*  4547*  4555*  4558*  4561*
                        4569*  4656*
PDCANS  024074           450   4692#  4714
PRIME   010550          2036   2040#
PRINTR  023566          4555   4569   4625#
PRINTS  023576          2426   2429   4558   4561   4627#
PROEND  012500          1380   2451#
PRTLVL  005112          1283*  1303*  1339   1346   1354#
PS    = 177776           346#   691*  2103*  2169*  2171*  2326
PUNCNT  022720          4438#
PUPS    024140          4701   4704#
PUVECS  024230          4692*  4693*  4701*  4723#
RALL    021132          4120#
RCUE  = 000004           427#  3505   3506
RCVISR  005106          1281*  1302*  1341   1352#
RCVORU= 040000          2716   3022#
RDAT    021130          4119#  4225
RDRCNT  022722          4439#
READ    022202          4268   4317#
READC = 000002          3180#  3633
RENDZ   021336          4157   4165#  4197
RENDI   021366          4168   4171#
REPORT  023072           883   2498   4503#
REQ   = 000000           361#  3285*  3337   3368*  3382*  3396*  3409*  3439*  3450*  3460*  3466*  3505*  3551*
                        3565*  3567*  3568
REQES   016754          3433   3437   3465#  3481   3484
REQST   016762          3466#
REQTBL  016212          3339   3348#
REQU    016744          3460#  3474
REQUX   017006          3448   3473#
RESYNC= 000010          2723   2746   2751   2757   3024#
RETRY   015700          3265#  3315   3317
RETURN  027634          2424   2431   4507   4553   4991#
REVRN   021140          1981   1986*  1988   4123#  4171
RFINIT  010264          1976   1995#
RFISR   021720          1997   4263#
```

```
RFLIM   021716          4246*  4296   4307   4328
RFRTI   022314          4287   4291   4308   4312   4329   4333*
RF11    023024           852   4479*
RINP  = 000001           424*  3565
RK3AR   022346          2012*  4346*  4352*
RKCSR   022350           855   2015*  4347*  4354*  4358   4366
RKCSRH  022352          4348*
RKDAE   022336          2014*  4342*  4351*  4370
RKDAH   022334          4341*  4372
RKDAR   022342          4344*
RKDBR   022340          4343*
RKDS    022332          2006   4340*
RKFUNC  022510          2011*  4354   4374*  4376*
RKINIT  010332          1996   2004*
RKISR   022424          2009   4358*
RKSTAR  022354          4350*  4361   4365   4369   4375
RKWC    022344          2013*  4345*  4353*  4362
RKWORD  022512          2013   4353   4377*
RK1     022364          4352*  4371   4373
RNULL = 000000           423*
RNUM    021126          4118*  4183   4228
ROTVAL  010676          2075*  2088
ROUTP = 000002           425*  3551   3552   3567
RPBAR   022530          2023*  4387*  4399   4400   4420*
RPCA    022516          4382*  4409
RPCSR   022532           858   2025*  2026   2031*  4388*  4390   4394   4401   4412*  4414   4422*
RPCSRH  022534          4389*
RPD     010460          2023*
RPDAH   022520          4383*
RPDAR   022524          4385*
RPDSR   022522          2028   2030*  4384*  4397   4398
RPFUNC  022700          2022*  4411*  4422   4427*
RPINIT  010426          2005   2018*
RPISR   022536          2020   4390*
RPSTAR  022622          4393   4408   4412*
RPTFLG  002734           699*   871    882*   886*
RPWC    022526          2024*  4386*  4421*
RPWORD  022676          2024   4421   4426*
RPX     022606          4395   4409*
RP0     022630          4414*  4415
RP1     022636          4410   4420*
RSTART  001000           460*
RSTPC   023206          4529*  4537*
RSTRG   023166          1620   1630   4500   4529*
RSTS  = 000003           426*  3466   3467
RU.ANC  001306           544*  2366   2419*  4025*  4095*  4230*  4334*  4356*  4424*
RU.DC1  001310           545*  2334   2336
RU.DC2  001312           546*
RU.DJ   001340           557*
RU.DL1  001334           555*
RU.DL2  001336           556*
RU.DMA  001322           550*
RU.DMB  001326           552*
RU.DN   001324           551*
RU.DP1  001316           548*
RU.DP2  001320           549*
```

DZQCAG.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
RU.DX    001332          554#  2357*
RU.KG    001330          553#
RU.KL    001314          547#
RU.MAP   001304          543#  2468*  4024*  4094*  4229*  4333*  4355*  4423*
R0     =%000000          334#   768*   894    943*   947*   951*   957*   963*   969*   975*   981*   987*   993*
                         999*  1005*  1011*  1017*  1024*  1033*  1034   1038*  1044*  1054*  1062*  1071*  1073*
                        1089*  1099*  1109*  1119*  1129*  1154*  1157*  1168*  1272   1273   1269*  1309*  1326*
                        1332*  1333*  1338*  1339*  1345*  1346*  1368*  1369   1370   1377*  1382*  1383*  1384
                        1390*  1401*  1485*  1509*  1510   1511*  1512   1513*  1514*  1515   1517*  1586   1798*
                        1837*  1859*  1873   1880   1896*  2050*  2052   2067   2160*  2164*  2167*  2179*  2198*
                        2202   2217   2309*  2310*  2312   2336*  2467*  2473   2475   4397*  4503*  4514*  4694
                        4713*
RCS      015672         3263#  3424
R1     =%000001          335#   742*   743    745    746    864*   867    881*   882    894*   898    905*   944*
                         946   1023*  1026   1032*  1133*  1137*  1138   1140*  1151*  1169*  1234*  1244*  1245*
                        1274   1338   1340*  1341*  1342*  1345   1347*  1348*  1349*  1391*  1396   1405   1412*
                        1414*  1418*  1423*  1425   1426*  1439*  1446*  1447*  1454*  1486*  1520*  1521   1522*
                        1523*  1524*  1525*  1528*  1535*  1539   1541   1552*  1575*  1576*  1577   1583*  1594*
                        1606   1614*  1617   1624*  1627   1636*  1642*  1649   1680*  1681*  1682   1690*  1693*
                        1698*  1700*  1704*  1708*  1799*  1804   1841   1860*  1868   1979*  1980*  1981   2051*
                        2052   2055*  2056   2059   2067   2069*  2070*  2071*  2072*  2104*  2107   2110   2113
                        2121*  2126   2128*  2129   2152*  2181   2193*  2219*  2220   2365*  2369   2382   2398
                        2409*  2414   2463*  2465   2497*  2521   2523*  2524*  2525   2532*  2534   2539   2541*
                        2542*  2543   2554   2557   2559*  2561*  2562*  2605   2607*  2608*  2609   2619*  2620
                        2622*  2623   2630   2632*  2633*  2634   2645   2650*  2651   2653*  2655*  2698   2700*
                        2701*  2702   2711*  2712   2714   2720*  2721*  2725*  2726*  2729*  2734   2736*  2737*
                        2738   2748   2749*  2754*  2756*  2833   2835*  2836*  2837   2853   2865   2867*  2868*
                        2869   2876   2880*  2883*  2886   2890*  2891   2893*  2894*  2896*  2897*  2905*  2906*
                        3031   3033*  3034*  3035*  3036*  3037   3049*  3050*  3159   3161*  3162*  3163   3170*
                        3218*  3220*  3710   3712*  3713*  3714   3735*  3736*  3738   3743   3745*  3746*  3747
                        3786   3788   3802   3804*  3806*  3807*  3850*  3858   3863*  3865   3927   3932*  3934*
                        3935   3951*  3977*  3997*  4002*  4398*  4495*  4497*  4505   4510   4512   4568   4695
                        4705*  4706*  4712*
R1S      015666         3261#  3423
R2     =%000002          336#   741*   743*   744*   769*   778*   787*   800*   817*   826*   865*   867*   906*
                         911    918    945*   946*  1025*  1030*  1031   1134*  1138   1170*  1283   1303   1392*
                        1398*  1399*  1400*  1419*  1424*  1427*  1440*  1448*  1453*  1455*  1493*  1510*  1523
                        1529   1553*  1560   1580   1615*  1617*  1625*  1627*  1637*  1643*  1644*  1647*  1691*
                        1692*  1699*  1701*  1707*  1708   1800*  1806*  1808   1815*  1817   1826   1834*  1835*
                        1836*  1861*  1873*  1893*  1898*  2054*  2055   2056   2060   2064   2105*  2107   2122*
                        2131   2153*  2157*  2158   2161*  2162*  2163*  2168*  2170*  2172   2174   2177*  2182*
                        2194*  2201*  2202*  2203*  2205   2208   2221*  2337*  2352*  2366*  2369   2382   2401
                        2408*  2409   2410*  2414   2462   2522   2525*  2526*  2527*  2528*  2529   2533   2534*
                        2540   2543*  2544*  2545*  2546*  2547   2550   2553   2554   2606   2609*  2610*  2611*
                        2612   2615   2618   2623*  2631   2634*  2635*  2636*  2637   2640   2643   2645   2647
                        2654*  2699   2702*  2703*  2704*  2705*  2706*  2707   2711   2716   2722*  2723*  2728*
                        2735   2738*  2739*  2740*  2741*  2742*  2743   2746   2748*  2751*  2753*  2757*  2834
                        2837*  2838*  2839*  2840*  2841   2844   2848   2850   2854*  2859*  2866   2869*  2870*
                        2871*  2872*  2873   2899   2907*  3032   3037*  3038*  3160   3163*  3164*  3165*  3166*
                        3167   3219*  3221*  3711   3714*  3715*  3716*  3717*  3718   3720   3737   3738*  3744
                        3747*  3748*  3749*  3750*  3751   3753   3767   3768   3770   3785   3849*  3859   3865*
                        3867*  3868*  3869*  3871   3876*  3879   3884   3902   3905*  3917   3928   3935*  3936*
                        3937*  3940   3942*  3944   3965   3993   4001*  4399*  4496*  4498*  4696   4711*
R2S      015662         3259#  3422
R3     =%000003          337#   770*   866*   868*   919*  1136*  1152*  1171*  1210   1284   1304   1323   1393*
                        1395*  1438*  1456*  1494*  1512*  1530   1554*  1561   1581   1616*  1618*  1626*  1628*
```

```
                    1801* 1803* 1862* 1879* 1883* 1884* 1885* 1888  1905* 2059* 2106* 2110  2123*
                    2124* 2125* 2132* 2199* 2203  2213  2214  2216* 2367* 2417* 2461* 2465  2468
                    3046* 3047  3720* 3721  3753* 3754  3770* 3771  3789* 3860  3871* 3873* 3884*
                    3885  3903  3929  3944* 3945  3949  3965* 3967  3973  4000* 4400* 4697  4710*
R3S     015656      3257# 3421
R4    =%000004       338#  771*  895  1172* 1182* 1195* 1211  1261* 1287  1298  1307  1317  1319
                    1394* 1396  1403* 1437* 1457* 1495* 1515* 1531  1556* 1562* 1563  1582  1641*
                    1645* 1802* 1804  1839* 1863* 1868  1897* 2060* 2129* 2200* 2209  2213  2464*
                    2467  2471* 3047* 3048* 3721* 3722* 3723* 3754* 3755* 3771* 3772* 3788* 3790*
                    3861  3885* 3886* 3888* 3902* 3903* 3904* 3905  3906* 3907* 3930  3949* 3950*
                    3967* 3968* 3969* 3971* 3972* 3973  3976* 3990* 3991* 3999* 4401* 4629  4630*
                    4650  4655* 4698  4709*
R4S     015652      3255# 3420
R5    =%000005       339#  903  920   935* 1281  1282  1302  1328  1329* 1555* 1594  1606  1614
                    1615  1616  1624  1625  1626  2166* 2174  2178* 2461  2476* 2523  2541  2607
                    2632  2700  2736  2835  2848* 2852* 2853* 2856  2867  2876* 2877  2880  2886
                    2898* 2901  2903* 2905  3033  3161  3712  3745  3851* 3863  3932  4003* 4495
                    4496  4699  4708*
R5S     015646      3253# 3419
R6    =%000006       340#  2326* 2327* 4560
R7    =%000007       341#  2329
SAT     021124      1979  4117#
SAVCC   022730      4442#
SAVE    007436      1826* 1827  1829  1845#
SAVPC   022726      4441#
SAVRG   023144      1613  1623  4494  4519#
SAVR2   022732      4443#
SAVR3   022734      4444#
SAVR4   022736      4445#
SAVTTP  016226      1734* 3264  3355# 3418*
SCALD.  017472      3607#
SCNENA= 000040      2146# 2170  2177
SCNT1   011134      2157#
SCNT1A  011154      2162# 2165
SCNT1B  011206      2169# 2180
SCNT1D  011240      2175  2177#
SCOPE = 104400       349# 2091  2120  2151  2192  2308  2317
SEGCNT  021122      4116#
SENSE = 000004       416# 3542
SENSEC= 000004      3182# 3635
SERV    021710      1999* 4243# 4263  4265  4267  4289* 4310* 4330*
SINPUT  016236      3349  3368#
SKIPVA  004776      1213  1215  1217  1219  1322#
SKIPV1  005006      1324# 1327
SKIPV2  005020      1325  1328#
SLR   = 177774       345#  695*
SM    = 000100       413#  1770
SMEN  = 010000       395#
SNS   = 000010       365#  3523* 3526* 3548  3558*
SNULL   016234      3348  3366#
SOUTPT  016336      3350  3382#
SO1     016434      3384  3394#
SP    =%000006       343#  692*  917   924   1375  2521* 2522* 2539* 2540* 2605* 2606* 2630* 2631*
                    2698* 2699* 2734* 2735* 2833* 2834* 2865* 2866* 3031* 3032* 3159* 3160* 3281*
                    3286  3710* 3711* 3743* 3744* 3849  3850  3851  3858* 3859* 3860* 3861* 3927*
                    3928* 3929* 3930* 3999  4000  4001  4002  4003  4582* 4700  4704*
```

```
SPACE   027637          2400    4556    4559    4565    4992*
SPW     006446          1657*   1670*   1684    1698    1759
SSCUE   016522          3352    3409*
SSTAT   016436          3351    3396*
SS1     016462          3398    3401*
SS2     016520          3400    3406*
SS3     016572          3411    3417*
SS4     016574          3345    3418*
STA   = 000002           435*   3399    3468    3483
STALL = 104400          3021*
START   000200           456*
STCH0   003150           956     961*
STCH1   003216           962     968     973*
STCH10  003654          1060    1068*
STCH11  003700          1069    1077*
STCH12  003724          1078    1086*
STCH13  003750          1087    1096*
STCH14  003774          1097    1106*
STCH15  004020          1107    1116*
STCH16  004044          1117    1126*
STCH2   003242           974     979*
STCH3   003310           980     986     991*
STCH30  004070          1052    1127    1133*
STCH4   003334           992     997*
STCH5   003360           998    1003*
STCH6   003404          1004    1009*
STCH7   003430          1010    1015*
STCH70  003504          1026*   1035
STCH8   003534          1016    1036*
STCH80  003520          1027    1031*
STCH9   003604          1037    1043    1049    1051*
STEP  = 000400          2144*   2163
STKSTB= 000002           401*   3296    3447
STOHLT  022762          4455*
STOR0   022742          4447*
STOR1   022744          4448*
STOR2   022746          4449*
STOR3   022750          4450*
STOR4   022752          4451*
STOR5   022754          4452*
STOR6   022756          4453*
STS   = 000016           368*    380*   3404    3415    3465*   3504*   3517*   3520*   3530*   3534
ST1     016334          3370    3380*
SVLAD$  024022          4668    4672    4678*   4686
SVRPC   023164          4519*   4526*
SWCHK   004104          1137*   1153
SWCHK2  004164          1139    1151*
SWITCH  003042           720     935*   1149
SWR   = 177570           347*    348     709     878     954     960     966     972     978     984     990     996    1002
                        1008    1014    1020    1021    1030    1041    1047    1056    1065    1074    1082    1092    1102
                        1112    1122    1132    2306    2314    2391    2421    2433    4543    4548    4571    4575    4669
                        4671
SW.ANC  001250           527*    960*   1951    1964    1975    1995    2004    2018    2365    2478    2485    2497
SW.DC1  001252           528*    966*   1172    1391
SW.DC2  001254           529*    972*
SW.DJ   001302           540*   1056*   1059    1068    1077    1086    1096    1106    1116    1126    1261    1860
```

```
SM.DJ0  001456          605#  1065*  1873   1880
SM.DJ1  001460          606#  1074*
SM.DJ2  001462          607#  1082*
SM.DJ3  001464          608#  1092*
SM.DJ4  001466          609#  1102*
SM.DJ5  001470          610#  1112*
SM.DJ6  001472          611#  1122*
SM.DJ7  001474          612#  1132*
SM.DL1  001276          538#  1041*  1799
SM.DL2  001300          539#  1047*
SM.DMA  001264          533#   996*  1195   1467   1506   1537   1558
SM.DMB  001270          535#  1008*  2149   2155
SM.DN   001266          534#  1002*  1634   1639   2116
SM.DP1  001260          531#   984*  1436   1444
SM.DP2  001262          532#   990*
SM.DX   001274          537#  1020*  1022*  1026   1232   1240   1664
SM.KG   001272          536#  1014*  2190   2196
SM.KL   001256          530#   978*  1182   1410   1421
SM.MMP  001246          526#   865    936    945    954*   955    961    973    979    991    997   1003   1009
                       1015   1036   1051   1134   1388   1434   1796   1851
SM00  = 000001          313#
SM01  = 000002          314#
SM02  = 000004          315#
SM03  = 000010          316#
SM04  = 000020          317#
SM05  = 000040          318#
SM06  = 000100          319#
SM07  = 000200          320#
SM08  = 000400          321#   329
SM09  = 001000          322#
SM10  = 002000          323#  4543
SM11  = 004000          324#  4671
SM12  = 010000          325#
SM13  = 020000          326#  4548   4575
SM14  = 040000          327#  4669
SM15  = 100000          328#
SMB   = 000400          329#  4667
SYSGEN  004204          721   1168#
SYSMMP  002130          719    765#
SYSM0   002666          863    872    875#
SYSM1   002732          879    884#
SYSRPT  012670         2444   2494#
SYSRST= 010000          400#  3268
SY.ANC  001212          511#   836*   847*   850*   853*   856*   859*   875    881
SY.DC1  001214          512#   769
SY.DC2  001216          513#   967
SY.DJ   001244          524#   826
SY.DL1  001240          522#
SY.DL2  001242          523#  1042
SY.DMA  001226          517#   787
SY.DMB  001232          519#
SY.DN   001230          518#
SY.DP1  001222          515#
SY.DP2  001224          516#   985
SY.DR1  001442          598#   800
SY.DR2  001444          599#
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SY.DT   001452            602#
SY.DX   001236            521#  817
SY.KG   001234            520#
SY.KL   001220            514#  778
SY.MAP  00121C            510#  766  864  877#  903#  944  1133
SY.NXT  001454            603#
SY.PAP  001450            601#
SY.PAR  001446            600#
SY.SW   002644            867#  869
TABTRN  011746           2325  2327  2333#
TCBA    021100           4105#  4179#  4224#
TCBLK   021116           4114#
TCCH    021070           1988#  4101#  4128#  4132#  4134#  4137  4148#  4151  4169#  4171#  4180#  4183#  4188
                         4198#  4201#  4206  4225#  4228#
TCNT    021074           4103#  4142  4156  4159  4193  4212  4216
TCEXPT  021120           4115#  4133#  4142  4158#  4159  4166#  4193  4215#  4216
TCFIRS  021112           1992#  4112#  4133  4212
TCF1    021220           4131  4137#
TCF1A   021210           4134#  4143
TCF2    021252           4144  4147#
TCF3    021270           4147  4151#  4182
TCINIT  010172           1965  1975#
TCIV    021102           1977#  4107#  4125#  4131#  4147#  4165#  4172#  4177#  4182#  4200#  4222#  4227#
TCLAST  021114           4113#  4156  4166
TCMSK   021110           4111#
TCPRT   021104           1978#  4108#
TCRBK   021604           4219  4222#
TCRBI   021636           4222  4227#
TCRTI   021652           4129  4135  4149  4170  4173  4181  4184  4199  4202  4226  4229#
TCR1    021454           4172  4188#
TCR1A   021510           4195  4198#
TCR2    021515           4194  4200#
TCR3    021532           4200  4206#  4227
TCR4    021564           4213  4215#
TCST    021072           4102#  4126  4167
TCWBK   021404           4162  4177#
TCWBI   021436           4177  4182#
TCWC    021076           4104#  4178#  4223#
TC11    023022            849  4478#
TEXTMP  022772           4463#
TIMES   024072           4675  4691#
TIOC    =000400          3178#  3631
TMPDAT  022760           1441#  1442#  1462  4454#
TRANSP  013530           2338  2340  2342  2344  2346  2348  2350  2353  2358  2360  2461#
TRAPS   023750            452  4667#
TR1     012542           2464#  2474
TR2     012546           2465#  2472
TR3     012560           2466  2469#
TR4     012576           2470  2475#
TSTCLE  017052           3455  3486  3491#
TSTX    017130           3494  3497  3500  3502  3508#
TSYNC   015052           1447  2714  3026#
TT      006450           1658#  1672#  1680  1733  3316
TTDAT   014552           2880#  2883#  2913#
TTP     =000001           375#  1733#  1734  3264#  3266#  3267#  3268  3273#  3274  3289  3292  3296  3300
                         3304  3312#  3313#  3314  3316#  3418  3432  3434  3447  3452  3518  3528  3540
```

```
                    3542    3563
TTTT     006452     1659#   1674#   3314
TTY    =%000005      342#   2398#   2401#   2425#   2428#   4510#   4554#   4557#   4560#   4568#   4595    4596#   4597
                    4599    4600#   4601    4603    4611#   4612#   4613    4614#   4636#   4638#   4640#
TYDEV    012224     2368#   2396#   2416#
TYPE   = 000004      354#    880    1141    2394    2395    2400    2424    2427    2430    2431    2436    2491    2495
                    2496    4507    4508    4546    4552    4553    4556    4559    4565    4577    4654    4716
T.B1     006276     1617#   1619
T.L001   006324     1627#   1629
T1     =%000002      376#   1738#   1747#   1755#   1765#   3334#   3335#   3336    3337#   3338#   3339
T2     =%000003      377#   1740#   1742#   1756#   1761
T3     =%000004      378#   1743#   1745#   1757#   1758#   1759#   1763#
UC     = 000002      410#   1692    1700    3184#   3189    3520    3655    3656    3657    3658    3659    3660    3661
                    3662    3663    3664    3665    3674    3675    3676    3677    3678    3679    3680    3681    3682
                    3683    3684
UCHKS  = 002000      404#   3518
UNIT     021106     4109#
UPADRS   021714     2001#   4245#   4282    4285#   4286    4290#   4303    4306#   4307    4311#   4324    4327#   4328
                    4332#
USEL     010222     1980#   1982
.      =%000005      379#   3274#   3275#   3276#   3281    3282#   3283#   3284#   3285#   3286#   3436#   3438#   3439#
                    3443#   3450#   3451#   3454#   3460#   3465#   3466#   3467#   3468#   3480    3483    3496    3504#
                    3505#   3506#   3517#   3520#   3521    3523#   3526#   3530#   3534    3547#   3548#   3549#   3550#
                    3551#   3552#   3558#   3559#   3560#   3561#   3562#   3565#   3567#   3568#
WAIT     016232     1732#   3278    3288#   3360#   3371#   3385#   3401#   3412#   3475#
WAITER   012662     2481    2491#
WC       021672     4236#   4280#   4301#   4322#
WDATA    021136     4122#   4180
WRITE    021752     4264    4275#
WRITEC=  000001     3179#   3632
WRTCHK   022066     4266    4296#
WRTM     021134     4121#
XLINK    012722     2442    2445#   2502#
XMHOOK   005202     1379    1381    1384#
XMISR    005140     1367    1375#
XMLOP1   010620     2054#   2068
XMLOP2   010624     2055#   2065
XMLOP3   010644     2057    2064#
XMRTS    010660     2053    2069#
XMTISR   005110     1282#   1348    1353#
ZFUB   = 000400     3557#   3562
ZO       011742     2328    2329#
Z1       012066     2356    2358#
.      = 031426      446#    447     448#    455#    459#    464#    467#    475#    478#    484#    1141    1148#   1371
                    1540    1595    1607    2007    2027    2029    2081    2083    2086    2089    2108    2111    2159
                    2173    2210    2530    2548    2551    2555    2613    2616    2638    2641    2708    2717    2744
                    2887    3060    3071    3168    3377    3391    4017    4034    4075    4078    4138    4140    4152
                    4154    4160    4189    4191    4207    4210    4217    4276    4297    4318    4359    4363    4367
                    4391    4572    4577    4605    4626    4643    4646    4651    4657#   4690    4716    4720    4727#
                    4729#   4731#   5066#   5069#   5073#
.BIT   = 166000        1#    355#   4667
.PR      023724     4623#   4625#   4627#   4628#   4630    4634    4644#   4645    4648#   4650    4654    4657#
.PRF     023644     4632    4635    4640#
.PRL     023622     4633#   4649
.PTIT    023610     4624    4629#
.SAVR6   024226     4700#   4704    4722#
```

.TYPE 023554 4599* 4600 4616#

F12


```
$ITYPE      1#  2398  2401  4510
BLKBLK      1#
BUFHDR      1#
C        4732#  4733  4734  4735  4736  4737  4738  4739  4740  4741  4742  4743  4744  4745  4746
         4747   4748  4749  4750  4751  4752  4753  4754  4755  4756  4757  4758  4759  4760  4761
         4762   4763  4764  4765  4766  4767  4768  4769  4770  4771  4772  4773  4774  4775  4776
         4777   4778  4779  4780  4781  4782  4783  4784  4785  4786  4787  4788  4789  4790  4791
         4792   4793  4794  4795  4796  4797  4798  4799  4800  4801  4802  4803  4804  4805  4806
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ASR      806   813  3049  3050  3951  3977
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ERRORS DETECTED:  0
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